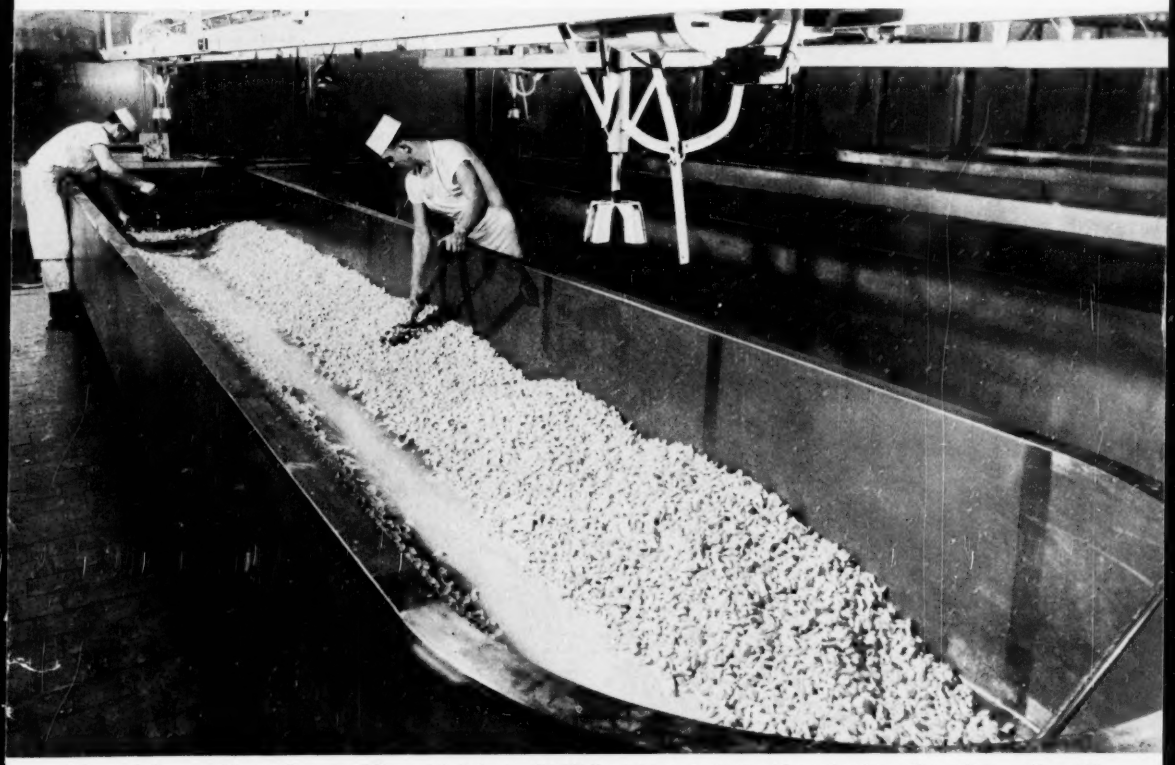
NATIONAL EDITION

Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication



Advanced cheese-making equipment at Tillamook includes ten 20,000-lb. stainless steel vats with overhead traveling agitators. (Page 44)

JULY, 1950: IFT highlights, Effective labels, Profit by spending, Continuous wine, Puffed fruit, Handling dries, Better warehousing, Outlook

Best in the WORLD for PRECISION— PRODUCTION— ECONOMY—

WORLD LABELERS

From these five types of WORLD Labelers you may select with complete assurance the one best Labeler for *your* glass containers, whatever their size, shape and variety — for *your* labels (body, front and back, all around, neck, shoulder, neck wrap, medallion, foil) — for *your* production and cost specifications.

WORLD BEE-LINE LABELER

The outstanding, precision production Labeler for quality application of labels to glass packed foods, condiments, wines, spirits, drugs, cosmetics and many other products. Now equipped with the exclusive Vacuum Gripfinger for accurate registration of body, neck, shoulder labels and medallions on round or flat surfaces, panels, etc. Production up to 2 or more per second.

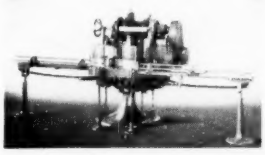
WORLD TANDEM LABELER

Engineered for high production, low cost labeling of round bottles and jars. Ideal for those having an eye to future expansion. One, two or three more units may be inexpensively added, any time. Production 75 to 350 or more per minute.

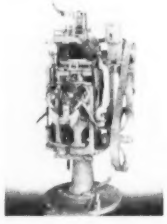
WORLD TURRET LABELER

For economical, dependable front labeling of a quality worthy of the finest products packed in glass. Takes containers from 2 to 4 inches diameter, 3 to 13 inches high. Uni-Turret or Twin-Turret models for 60 to 140 per minute production.

WORLD ROTARY LABELER



Day in, day out operating reliability and economy for labeling round containers from 4 oz. to 32 oz. body, or body and neck, or body, neck and foil labeling at the rate of 85 or more containers per minute.



WORLD MODEL "S" LABELER

A dependable performer, semi-automatic in action, easily operated even by unskilled labor. Applies all kinds of labels to all container sizes from vials to gallon jugs.

BEE-LINE TANDEM TURRET ROTARY MODEL "S"

One of these Labelers is best in the WORLD for you. We'll gladly send the Bulletin you want. Also full information, floor plans, production and cost estimates. Simply tell us your output requirements, and mail a sample of your bottle and label. There's no cost for this service, and you'll be under no obligation.

"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Every Purpose

WORCESTER, MASSACHUSETTS

New York Philadelphia Pittsburgh Chicago San Francisco Los Angeles Denver Louisville Salt Lake City El Paso Seattle Portland Phoenix London Montreal Toronto Winnipeg Newfoundland Vancouver Mexico City Sydney, Australia Wellington, N.Z. San Juan, P.R. Ciudad Trujillo, D.R. Honolulu, T. H.

FOOD INDUSTRIES July 1950 Vol. 22 No. 7 Published monthly by McGraw-Hill Publishing Co., Inc. Publisher, Wallace F. Traendly. Price 35c per copy. Publication Office 99-129 N. Broadway, Albany 1, N. Y. Subscription rates: United States and possessions, $3 for 1 yr., $4 for 2 yrs., $5 for 3 yrs. Canada, $4 for 1 yr., $6 for 2 yrs., $8 for 3 yrs. (payable in Canadian or U. S. funds). Pan American Countries, $5 for 1 yr., $8 for 2 yrs., $10 for 3 yrs. Entered as second class matter Aug. 26, 1948, at Albany post office under Act of Mar. 3, 1879.

FREE READER SERVICE . . .

HOW TO USE POSTCARD

Circle numbers of items you want to know more about; fill in your name and address; drop in mail (no postage required). We will tell companies what you are interested in and they reply direct to you.

TO MAKE IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes: (1) editorial items on new equipment, new products, new literature; (2) products advertised; (3) advertisers.

WHAT THE NUMBERS MEAN

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

Editorial Items: There is a page number on the postcard for each editorial item; ABC's distinguish the specific items on the page.

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For more data, circle item number on postcard

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EDITORIAL ITEMS **No. 2618**

90A	95A	110C	157C	157M	158D					
90B	95B	113A	157D	157N	158E					
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LABELERS

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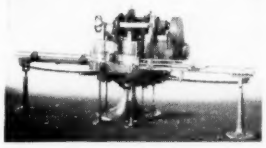

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90A	95A	110C	157C	157M	158D					
90B	95B	113A	157D	157N	158E					
91A	96A	113B	157E	157O	158F					
91B	96B	113C	157F	157P	158G					
91C	98A	114A	157G	157Q	158H					
92A	98B	114B	157H	157R	158I	159C	159H	160B	160G	
92B	98C	116A	157I	157S	158J	159D	159I	160C	160H	
92C	98D	116B	157J	158A	158K	159E	159J	160D	160I	
92D	98E	116C	157K	158B	159A	159F	159K	160E	160J	
94A	110A	157A	157L	158C	159B	159G	160A	160F	160K	
94B	110B	157B								

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2b	22e	32-33c	111a	125	143	158	172	187b	197a
2c	22f	34	111b	126	144a	159	L174	187c	197b
2d	22g	93a	112a	128a	144b	160	R174a	188a	197c
2e	22h	93b	112b	128b	144c	161	R174b	188b	197d
4	22i	94	112c	128c	144d	162	R174c	189a	197e
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19	29d	101d	121b	139b	153b	171a	185a	192	RT204
20-21	29e	107a	122a	T140	153c	171b	185b	193	LB204
22a	30	107b	122b	B140	154	171c	T186	194	TL208
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READER SERVICE POSTCARD

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90A	95A	110C	157C	157M	158D					
90B	95B	113A	157D	157N	158E					
91A	96A	113B	157E	157O	158F					
91B	96B	113C	157F	157P	158G					
91C	98A	114A	157G	157Q	158H					
92A	98B	114B	157H	157R	158I	159C	159H	160B	160G	
92B	98C	116A	157I	157S	158J	159D	159I	160C	160H	
92C	98D	116B	157J	158A	158K	159E	159J	160D	160I	
92D	98E	116C	157K	158B	159A	159F	159K	160E	160J	
94A	110A	157A	157L	158C	159B	159G	160A	160F	160K	
94B	110B	157B								

ADVERTISEMENTS

2a	22d	32-33b	109b	124	B142	157	171f	187a	196b
2b	22e	32-33c	111a	125	143	158	172	187b	197a
2c	22f	34	111b	126	144a	159	L174	187c	197b
2d	22g	93a	112a	128a	144b	160	R174a	188a	197c
2e	22h	93b	112b	128b	144c	161	R174b	188b	197d
4	22i	94	112c	128c	144d	162	R174c	189a	197e
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FOOD INDUSTRIES editorial and executive offices: McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York, 18, N. Y. James H. McGraw (1860-1948), Founder; Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Nelson Bond, Vice-President and Director of Advertising. Cable address: "McGraw-Hill, N. Y." Address correspondence regarding subscriptions to J. E. Blackburn, Jr., Vice-President and Director of Circulation. Member A.B.P. and A.B.C. Indexed monthly in Industrial Arts Index.

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NEW! Allis-Chalmers All-Metal Gyratory Sifter

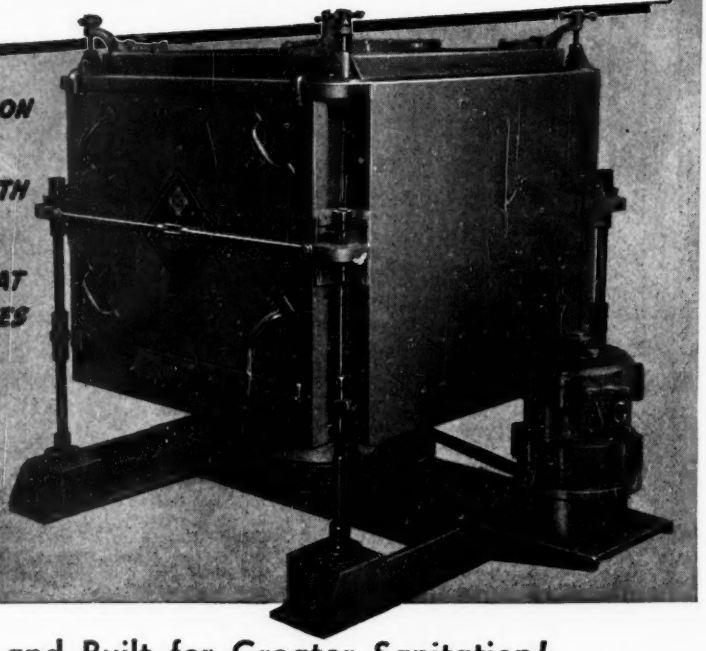
★ GREATER SANITATION

★ INCREASED STRENGTH

★ CAN BE OPERATED AT HIGH TEMPERATURES

★ EASIER TO CLEAN

★ AVAILABLE NOW



Designed and Built for Greater Sanitation!

HERE'S a new *Low-Head* gyratory sifter for the food processing industry . . . made entirely of metal, light in weight and built strong for long, dependable operating life. All riveted joints are gasket-sealed. There are no cracks, no crevices — and no chance for leakage of fine materials.

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Light weight metals are used throughout, contributing to smooth sifter performance and exceptionally low maintenance. And you can safely handle high temperature materials because there are no wooden parts. Each sifter holds 4 to 7 sieves . . . is powered by a 1 hp explosion-proof Allis-Chalmers motor with Texrope Drive.

They're available *now*—ready for prompt delivery!

HANDY INFORMATION PACKET

Send coupon at right for further details on the new Allis-Chalmers all-metal gyratory sifter. Ask for the handy packet — with advance information on this sifter and a copy of bulletin 06B6124A on the standard Low-Head gyratory sifter. If you so desire, an Allis-Chalmers representative will call. No obligation.

A-2919

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MILWAUKEE, WIS.

☐ Please send handy packet with information on new All-Metal sifter and standard-sifter bulletin 06B6124A.

Name

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Low-Head and Texrope are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Serving the Food Industry for 102 Years

HIGHLIGHTS

Food processing industry shipped $32,944,173,000 worth of foods for human consumption in the conservative estimate of the 1947 Census of Manufacturers. In 1939 output was around $9,000,000,000. Only one industry—chemicals—topped food's 1947 shipments. And in 1947 bigger years were just about to be realized, with still bigger ones promised.

Plastic-coated collapsible metal tubes for packaging such foods as peanut butter, cream cheese and jelly spreads, cake icings, mustard, catsup and other condiments are being tested. At the moment researchers are working on Pliofilm, vinyls, polyethylene, and saran coatings.

Nuggets of soft, puffed fruits, that retain their natural color and that have less than 2 percent moisture, have been produced in a new pilot evaporator that uses hot oil to evaporate the water. This could open up a whole group of new fruit products. (See article).

A newly developed cake mixing method using granulated sucrose to give maximum volume, better emulsion and a high degree of aeration, has been developed by American Institute of Baking. Secret is a 30-sec. "pre-mix" of granulated sucrose and one-half its weight of water, before incorporating rest of ingredients. Another instance where research has paid-off. (See article).

First commercial application of electron bombardment for sterilization has been made by Upjohn Co., Kalamazoo, Mich. High-priced antibiotics are being sterilized in this case, but the development may portend eventual practical use, in the food field, of a revolutionary sterilizing method, which up to now has been only of experimental interest.

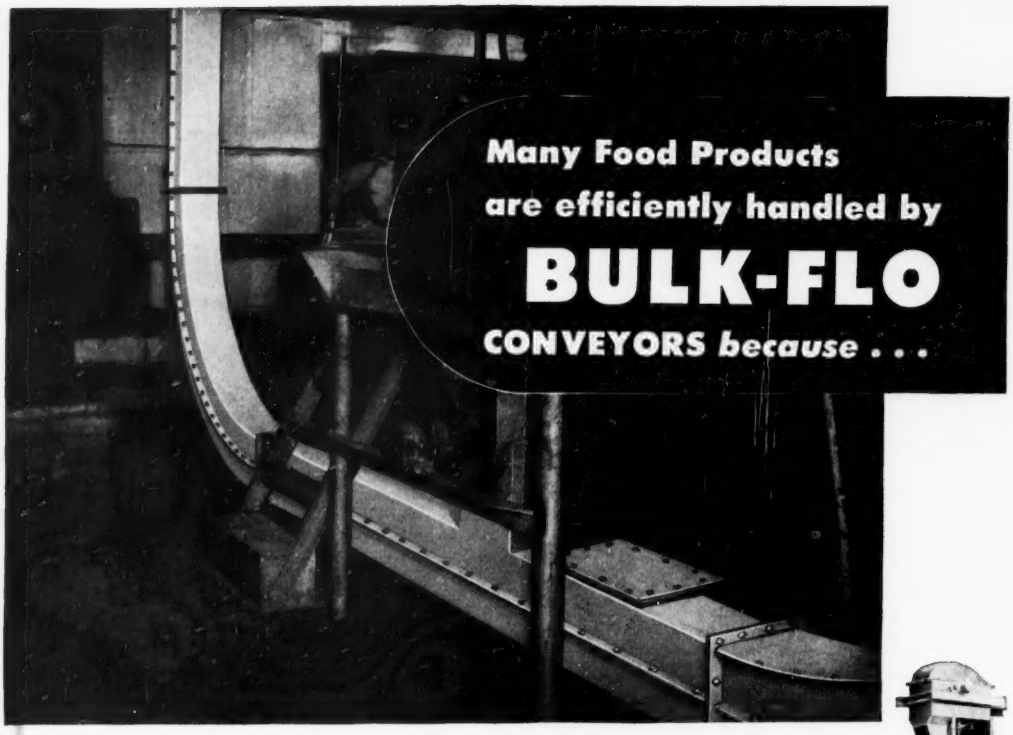
Unforeseen corrosion of tinplate caps on baby food jars was reported at the IFT conference. It is attributed to a unique galvanic couple. Anode is microscopic areas of exposed metal on inside portion of cap. Cathode is raw-cut periphery of cap. Electrolyte between them is food liquid in seal. (See Special Report for this and many other significant items).

Brown-N-Serve French bread has been introduced with great initial success by Pepperidge Farms, Norwalk, Conn. Two loaves totalling 9 oz. are packaged together in cellophane-window carton. French bread is a "natural" for this technic. Loaf is small enough to eat at one sitting. Regular baked product gets hard in a few hours in retail store. Others are likely to follow suit.

Continuous manufacture of a better wine in less space and with less labor is claimed for a specially designed 100,000-gal. concrete fermenting tower, developed by an Argentine engineer. Unlike the conventional batch method, wine is drawn off periodically and crushed grapes are added without waiting for fermentation to stop. Grape skins and seeds are automatically removed. Even the ancient art of wine making is susceptible to advances in engineering. (See article).

Crystallized fruit spread—a new product developed at the Eastern Regional Research Laboratory—is reported to rate high in flavor. It consists of fruit and honey, vacuum-cooked to 83 percent solids and then allowed to crystallize at 60 deg. F. for seven days. Product does not require pectin. (See article).

Have you developed a new food process that should be entered for the 1951 FOOD INDUSTRIES Award for achievement in food technology? Nominations now are open and may be made by anyone. Deadline for entries is Jan. 1, 1951, but most are expected well ahead of that date. If you have a process that merits the jury's attention now is the time to begin preparation of the entry. (See News).



Many Food Products are efficiently handled by

BULK-FLO

CONVEYORS *because . . .*

- It is self-loading to capacity, requiring no separate feeder.
- It simplifies the layout — one Bulk-Flo often serving where several other types of conveyors would be required.
- It is very compact, occupying minimum space.
- It operates slowly, moving the material in compartments, without churning action, thus assuring gentle handling of material with minimum power consumption.
- Most material can be conveyed whether the compartments are fully or partially loaded.
- It assures dust-tight operation, and minimizes degradation of material.
- If a vertical unit is operated for several minutes at the conclusion of a run, no appreciable amount of material will remain in the carrying run of casing.
- It permits the use of multiple feed and discharge points along horizontal runs of conveyor.
- Each conveyor flight substantially fills the area of conveyor casing, therefore prevents backward avalanching of materials on vertical runs.
- It is extremely flexible in its field of application, because of the various paths of travel possible and the ability of one Bulk-Flo to convey both horizontally and vertically or on an incline.
- Bulk-Flo equipment frequently costs less than that of other types of conveying and elevating apparatus required to accomplish the same function or purpose.

- **A Link-Belt engineer will be pleased to discuss your problems without obligation.**

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BULK-FLO

Elevator-Conveyor-Feeder

Separated-run design, L-path arrangement Bulk-Flo with side-discharge or front-discharge head section for multiple feed points and where feed control and accessibility are essential.

The Talk of the Industry

Chance for Distinction

Another award for achievement in food technology will be presented in 1951 by FOOD INDUSTRIES. So if your company has a process of which it is proud, here is an opportunity to achieve distinction and make your employees happy by gaining formal recognition at the next IFT conference.

Send information on your process to the Editor of FI, 330 W. 42d St., New York City 18, before the end of this year. For details see item on page 132.

Don't let your modesty belittle your chances of becoming the talk of the industry.

Now Smell Enters Package Design

Want your package to smell like what's in it? Can do. Many paper manufacturers now are adding small amounts of vanillin, ethavan and coumarin to their products. These chemicals can be incorporated in the pulp or pressed into the finished paper for a reasonable cost, says Monsanto Chemical Co.

Smell being associated with taste, the perfumed packages could add real come-on to appetizing label design. But if the idea were widely adopted, we shudder to think what supermarkets would smell like.

They Come Out Good, No Matter What

Corn Products Refining Co. puts a lot of effort into the development of new recipes for its food products. But it has not installed ultramodern equipment in its Home Service kitchens. Instead, its home economists work under conditions found in the average home, and with the same type of appliances.

Like modern photographic films, recipes should have a wide performance latitude to give good results in the hands of the amateur who must work under something less than ideal conditions.

Fresh Fish—and No Fooling

It is well known that strictly fresh fish in any form are not commonly available to the consumer. But the Danes have decided to do something about it. After being caught, cod are kept alive in well-boats or special floats until they reach the processing plant. Then they are taken from the water, stunned by a blow on the head, beheaded, gutted and rinsed for delivery to the filleting room. The fillets are rapidly cooled and frozen, or held at 30 to 32 deg. F. until shipped.

The Danes seem to have something there. The only way to increase per capita consumption of fish is for the fish to be its own salesman.

The Growing Boom in Florida

If you think of Florida only as a state where oranges grow and Northerners play in wintertime, you have a surprise coming. The sunny state is becoming noted as a beef producing area—is even selling beef to Texas. It is stepping up milk production—so much that three dairy cooperatives recently were looking for someone to concentrate and freeze milk. Both of these developments stem from improvement in cattle herds and the planting of tropical grasses that make nutritious pasture on the sandy soil and under the hot sun of Florida.

Pineapples are grown there, too. And so are vegetables for canning, particularly in the rich soil of the drained Everglades area.

This is typical of a food awakening taking place in the Southeast.

Profit and Problem in Bulk Ice Cream

Bulk ice cream packages have had good acceptance, and have been one means of thwarting retail dealers who charge too much for pints and quarts. After almost five years of experience with the gallon container, a leading Eastern ice cream manufacturer was selling about 6 percent of his gallonage in that size package.

Spurred on by this success, the company introduced a half-gallon container last fall. It caught on fast, and the two bulk packages now account for about 12 percent of the plant's total gallonage. But the half-gallon has taken business from the gallon, and unfortunately it increases packaging costs.

Hors d'Oeuvres

■ U. S. Brewers Foundation heard a college official propose a student course in moderate drinking. Said, "Why not? We teach sex, humanities and other similar subjects, now." We can report little progress in trying to find out what those other similar subjects are.

■ And in its annual statement, Clinton Foods says, "Snow Crop has become a very valuable trade mark." Just shows you what a safe distance from Hollywood can do for a colossal enterprise.

■ BLS is adding 110 new food items—including frozen foods—to the 50 they have been pricing since the '30's to measure living cost changes. Apparently, BLS has wearied of snacks and is going to try a full meal.

■ More than 75 percent of Russia's purchases of U. S. goods during March consisted of artificial sausage casings —$22,500 worth. This offers no mystery to us. They are simply getting ready to invent artificial sausage casings.

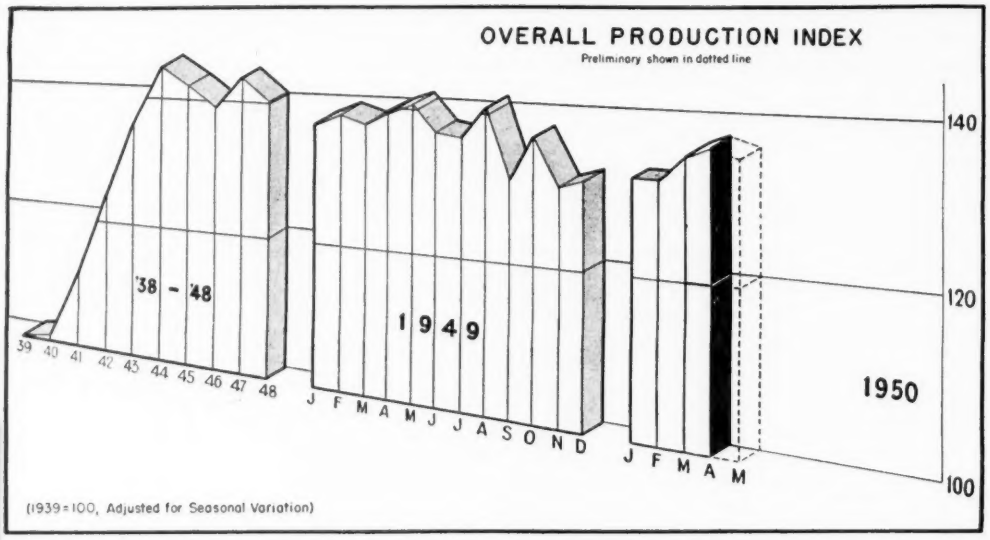
■ A survey reveals that food firms lead all industry in providing company lunch rooms and free refreshments. You didn't expect to find them trying to discourage such habits, did you?

■ UP reports Egyptian archeologists uncovered two small eggs that looked like hen's eggs and "were probably 5,000 yr. old." Bet you 5,000 yr. from now they won't identify USDA's powdered eggs that easily.

■ Canadian ambassador to Brazil sees little chance of cheaper coffee in next few years. National Coffee Assn. says the raw stuff has already gone down as much as 10c. per lb. on some grades since January. We mention all this just in case you were in some doubt about coffee prices.

J.A.J.J.

FI Index and Outlook


OVERALL PRODUCTION INDEX
Preliminary shown in dotted line
140
120
100
'38 - '48
1949
1950
39 40 41 42 43 44 45 46 47 48
J F M A M J J A S O N D
J F M A M
(1939=100, Adjusted for Seasonal Variation)

Slight Decline in Food Production Reflects Poor Growing Weather

Lower crop yields also cause revision in processing outlook, particularly in canning and freezing

SLIPPING SLIGHTLY from the revised April figure of 137, overall food production wound up at 136 for the May preliminary figure.

Bad weather in both May and June has affected the outlook for processing activity by reducing the chances for good crops. The canning and freezing industry particularly has been affected by the cold spring that delayed vegetable plantings, then a later hot spell that may cause peas particularly to mature too early and spoil quality.

The total pack of canned fruit and vegetables, which had been expected to be only moderately below 1949, may now fall considerably short of that figure. Since canning is the major activity of the food industries during the summer months, a decline in the overall index of food production must be expected. This does not, of course, change the outlook for other individual products. Ample supplies of meat, milk, grains, sugar and vegetable oils are still in prospect.

For the first time in several years there is likelihood of shortages and higher prices for canned fruits and vegetables. During 1947-49 the canning industry was beset with surpluses as prices sank and distributors steadily reduced their inventories. But in 1950 two factors have brought a rapid change in the situation: 1) Shipments of canned goods in recent months have been relatively heavy. This reflects the high level of consumer incomes and retail demand. 2) Freakish weather has reduced the likely size of new packs. And this is particularly true for some items where inventories are already low.

The markets are now strong enough to warrant increased packs in many instances. But it is too late to change the contracted acreage. And where acreage planted actually is above 1949, yields are likely to be lower because of the unfavorable weather.

At a Glance—

(1939 = 100, with all figures adjusted for seasonal variations.)

	Apr. 1950	Mar. 1950	Percent Change	Year Ago
Baking	129	128	+1	128
Butter	83	87	−5	81
Canning	149	151	−1	154
Cheese	170	178	−4	171
Confectionery	131	132	−1	131
Evap. Milk	122	141	−13	126
Flour	116	125	−7	109
Ice Cream	161	170	−5	175
Malt Liquors	177	176	+1	169
Margarine	225	332	−32	269
Meat Products	151	147	+3	145
Sugar	107	103	+4	94

Pack Estimates

Here is the outlook for individual fruit and vegetable packs, according to early information obtained from the Department of Agriculture and from the Foods Division of the Department of Commerce:

Peas: Prospective carryover into the new season is only about 6,000,000 cases. This would ordinarily call for a substantial increase in production. But the normal procedure of staggering crop maturities has been upset first by late plantings, then by hot weather making some plants mature early. And if crops run together, canners in many localities may have to abandon acreage in order to maintain quality.

Apricots: Stocks are very low. Raw fruit production is up considerably. With less of other fruits available, packers may process as much as 4,000,000 cases of apricots this year.

Cherries: The pitted cherry crop has been good. But a short crop of sweet cherries seems likely. This means a ready market for the large carryover of sweet cherries from last season.

Snap Beans: Despite heavy shipments to date, canners' stocks are still much above last year. Acreage has been correspondingly reduced, and the new pack will probably be 15-25% below last year's record production.

Corn: This is a prime example of the reversal accomplished by heavy selling in the last few months. Carryover will be about 20 percent more than last year and perhaps double normal holdings. But this is a much less burdensome inventory situation than seemed likely after last year's enormous pack. And stocks may be no more than adequate in view of the reduced pack in prospect.

Lower Crop Yield

Acreage planted for processing will probably be cut 25 percent from last year. Average yield is also likely to be lower than the record level of 1949. How much lower is still not determined. Raw supply could well be a third less than last year. Production will be down similarly, perhaps to as little as 20,000,000 cases.

Tomatoes: Carryover into the new season may be 20 percent less than last year. And sales are continuing strong. If the raw supply is available, the industry may pack 25 percent more in 1950, or 25,000,000 cases. The demand for tomato juice is similarly strong, favoring an increased pack. Plantings are reported up from last year. But there is still some question whether yields will be high enough to permit the desired increase in production.

Peaches: Shipments have run almost a third higher this season than last. Most of the big 1949 crop is disposed of, leaving only slightly higher stocks than at this time a year ago. But condition of the new California crop is bad. Early estimates put it 25 percent below 1949. In addition, this year's clingstone pack is restricted to peaches meeting rigid specifications. So the number of cases canned will be considerably lower.

Pears: Here too shipments are well ahead of last season, indicating strong demand. But the freeze in California earlier this year has reduced the size of the crop to be expected. The forecast is for a 22 percent decline in the quantity of pears available for canning.

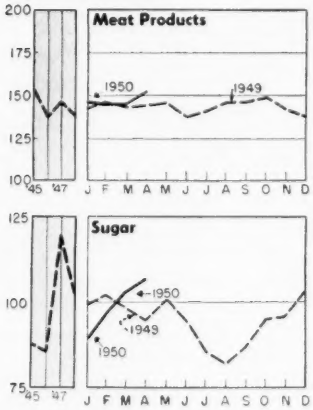
5. Fruit cocktail: This has been a slow-moving item, despite price cuts. Consumer preference has evidently shifted to other fruit dishes. Consequently, the new pack is likely to be somewhat smaller than last year's, which was 30 percent under 1948.

Effects of Smaller Pack

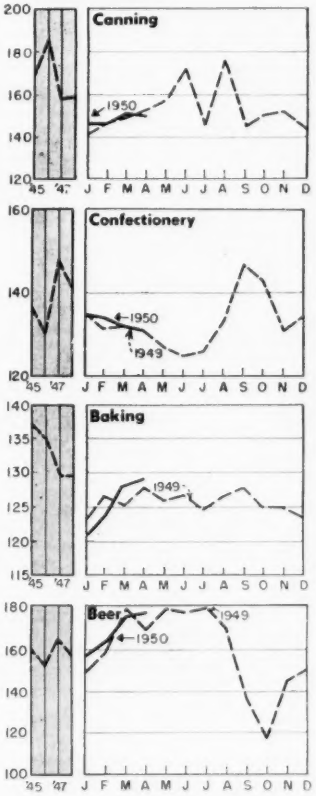
The chief effect of smaller packs for many canned items will be to shift existing inventories held by canners into the hands of distributors. As canners' inventories are not too high in most cases, total supplies will be fairly short. The logical result would be higher prices. The canning industry faces a substantial increase in costs owing to the new minimum wage law. And this will add to price pressure.

A second effect, of course, will be lower demand for cans, labels, syrups and other ingredients used in processing. However, it is important to understand that this drop in demand is chiefly due to bad luck with this year's crops and not to lower demand for canned goods.

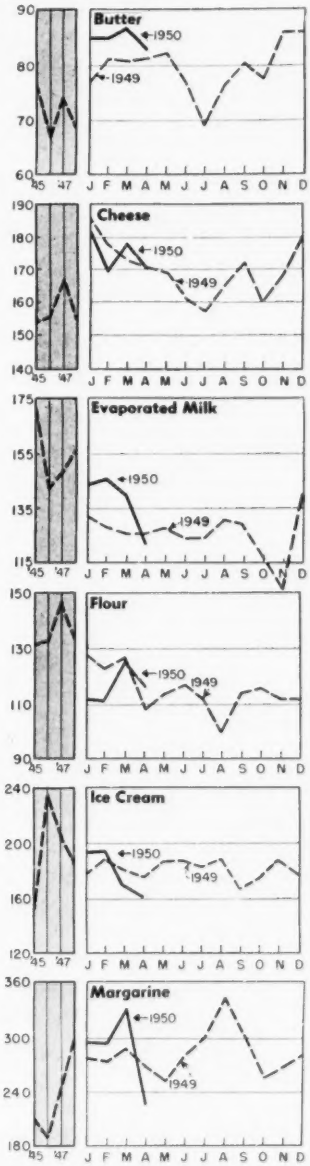
RISING ▲

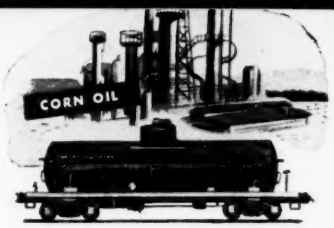


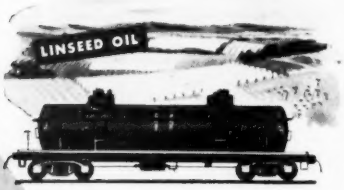
STEADY →



FALLING ▼







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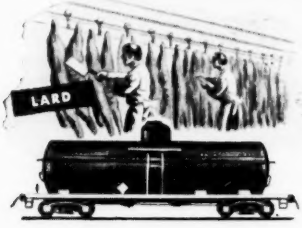

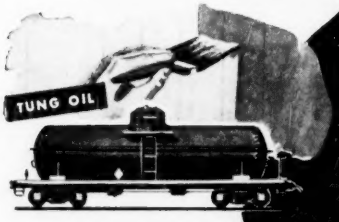

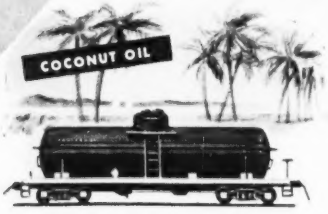

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What Washington Thinks

RESPONSE TO DAY-LENGTH—Plants respond with more vigorous growth and stimulated flowering or maturing of fruit when the days are long. That generally known fact is now supplemented by results of investigations of the influence of wavelength of light, and studies of artificial light as compared with sunlight. Indications are that the plant responds to visible and invisible radiation in the same manner, whether the sources providing the energy be natural or artificial. A control of exposure, if feasible, will provide much in the way of control of growth and maturing of all photosensitive plants. It looks as though food technologists now must become photometric experts, too.

PAINTED POTATOES—Uncle Sam has been dyeing potatoes blue when they have been destined for destruction under the price-support surplus program. And now the growers themselves have taken up "painting." Only they've been using a red dye, which makes the potatoes look more attractive and command a better price on the market. The government says "naughty, naughty!" Prosecution under Food & Drug Act is promised unless the industry will see the light and quit. There is no objection to wax coating, since that makes the potatoes keep better. But synthetic blush constitutes adulteration because it makes the food look better than it actually is.

REFRIGERATION ALSO! — Some prepackers of fruit and vegetables have apparently been trying to take advantage of attractive containers without adequate care as to the storage and transport conditions. Research & Marketing Act made a field investigation, emphasized that refrigeration is just as important even though select produce has been carefully harvested and prepackaged. In fact, the extra investment in the field prepackaging makes superior refrigeration an essential if the whole operation is to be profitable.

BOTULINUS CONTROL—One very specific result seems almost certain from the study of control of microscopic organisms in food processing by addition of subtilin. Western Regional Research Laboratory results, announced recently, indicate that subtilin is very effective against botulinus, including the heat-resistant spores that commonly resist methods of home canning of vegetables. Practical application in the home is a matter yet to be developed. Even a bit further ahead is the question of the economic use of tiny amounts of subtilin in sterilization of canned fruits and vegetables at lower temperature or for shorter cooking periods. The government warns against expecting early application, but seems very enthusiastic as to the long-run possibilities.

ULTRA-VIOLET FORBIDDEN—Certain ultra-violet lamps and other electric equipment may produce ozone. Installations deliberately intended to achieve quick aging of beef are permitted. But use of that equipment is allowed only in coolers that are set aside for this specific aging process. This equipment is definitely forbidden, by a new order of the Bureau of Animal Industry, in other parts of the animal processing plants. The Meat Inspection Division explains that this is because "ozone affects an inspector's sense of smell and also masks odors, thereby interfering with the processes of inspection."

"ALAYAM CANDY" — Alabama Agricultural Experiment Station, at Auburn, some time ago developed a new sweet potato candy. This was christened "Alayam Candy." A field study of consumer reaction has just been summarized by Bureau of Agricultural Economics. Favorable purchaser reaction is reported, as well as the fact that "this new type candy stood up better in comparison with brittles and hard candies than with other candies." Commercialization is being encouraged, but is not yet reported an accomplished fact.

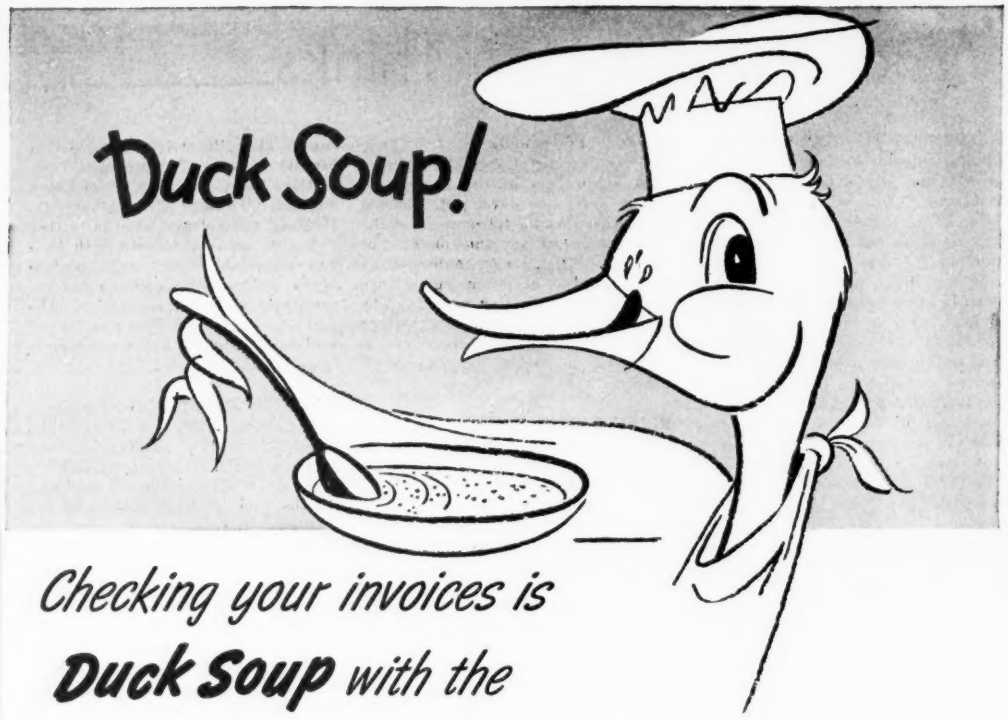
DEGREE OF HAZARD—A very constructive classification of toxic residues and other chemicals used for pest control has been given out by Food & Drug Administration. In his testimony as Part B of the toxic-residues hearing, Dr. Arnold J. Lehman submitted five lists of commodities that might be present as residues on fruits and vegetables. Those on the first list are of low toxicity, hence constitute no health problem. Those on the second and fourth lists are known to be deleterious, but probably create no health hazard with good practice. Under the third list are widely used pest control chemicals, which are of serious and significant import. The fifth list defies classification because of lack of information. Ultimately, the chemicals therein listed will end up in one of the other lists. No food technologist who has either direct or indirect concern with food raw materials which might contain spray residues, dares ignore the implications of this classification. The full meaning of each item remains yet undefined. But the broad meaning is clear—"Look out!".

SABATH RESOLUTION—The House of Representatives, it appears likely, will have a real investigation of chemicals in foods, adulteration, and the relation of many chemical problems to the basic dietetic welfare of the nation. This checkup will be conducted under a resolution that Mr. Sabath submitted nearly a year ago as H. Res. 323. For many months it looked as if this and the corresponding Keefe resolution were dead. But the pressure of certain interests, some very hard to identify, finally pushed this inquiry forward and gave it enough political glamor to secure favorable consideration in an election year. Nominally addressed to the problems of the chemical industry, it will also be very important to all of the food business. It will bear watching.

PREVENTIVE MAINTENANCE—A special engineering committee, which has been working since last year's Presidential Conference on Industrial Safety, has concluded that one of the most important ways to gain greater protection for industrial employees is to insist on preventive maintenance. This means a "stitch in time" process. In other words, when equipment or structures need repairs, they should be fixed before somebody gets hurt—not afterward. You can call it one of the most sensible of bureaucratic findings.

BUYING HABITS—An elaborate survey has been made by the Department of Agriculture to determine the number of families buying typical quantities of fresh fruit and fresh vegetables. The results are to be used primarily in estimating the dietetic significance of pesticide residues that may be found on these fresh foods. But they will also have very considerable practical value in indicating to food processors the size of the business they have not yet captured.

—R. S. McBride, Washington, D. C.



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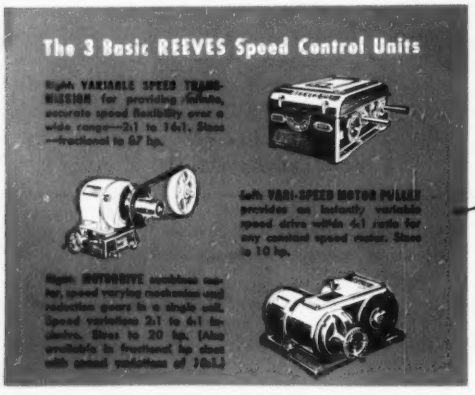
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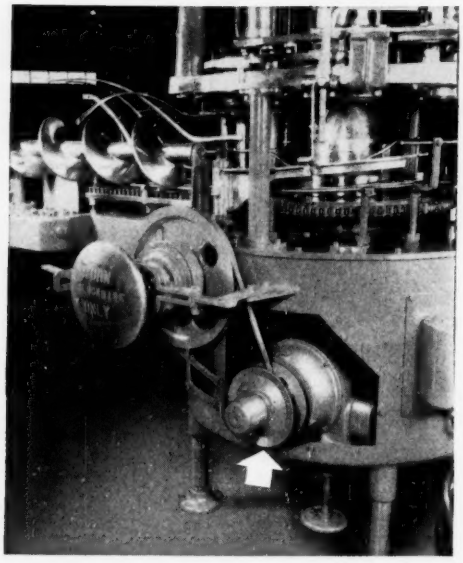

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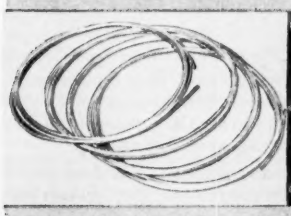
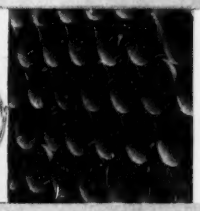
Our manufacturing methods and modern facilities permit us to supply TRENTWELD Tubing in a complete range of tube sizes from ⅛" to 22" diameter in long lengths or up to 30" diameter in shorter lengths. Whatever your industry,





there's TRENTWELD Tubing to fit your design. Our years of experience as tube specialists is at your call. Write us full details about your application.

TRENT TUBE COMPANY
Subsidiary of Crucible Steel Company of America
General offices and plant: East Troy, Wisconsin
Sales Offices: Chicago — 4501 W. Cortland St.
New York — Chrysler Building

TRENTWELD

STAINLESS STEEL TUBING

here's low-cost mechanical power from process steam

If you use low-pressure steam for heating, drying or cooking, General Electric standard Type DP mechanical-drive turbines will give you mechanical power reliably, safely, at minimum cost!

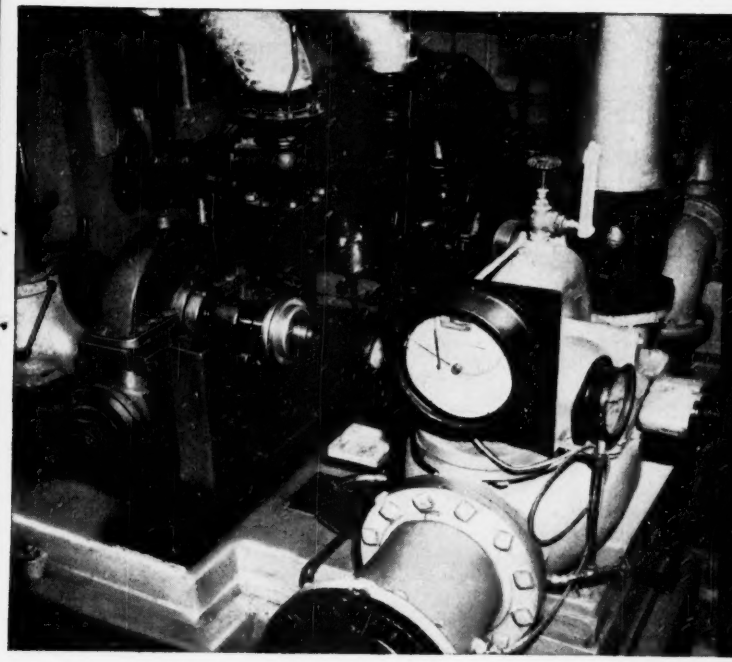
Mechanical-Drive TURBINES for FOOD PLANTS

Here's a way to produce food-plant power you just can't beat—use General Electric standard Type DP mechanical-drive turbines! They replace reducing valves to drop process steam down to utilization pressures and "skim off" only a small portion of the steam's heat, leaving the balance for process use. You get mechanical power as a by-product, at almost no cost!

These versatile G-E turbines pay off in many other ways for food plants. Depending only on the steam supply for their operation, they protect continuity of service against electric power failure, or serve as stand-by drives. Where existing electrical systems are overloaded and steam is available, they are an ideal choice. Direct-connected, they operate high-speed blowers and compressors without the need for step-up gears. They are readily adaptable to adjustable-speed applications and to automatic speed control. Finally, they can be installed in hot or damp locations, or in explosive atmospheres, without needing added protective equipment.

Most important, all the special features that make these advantages possible are included as standard equipment—at no extra cost. For more information on the advantages of the Type DP, send for Bulletin GEA-4955A, or contact your nearest G-E office. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC



Where can you use these versatile turbines?

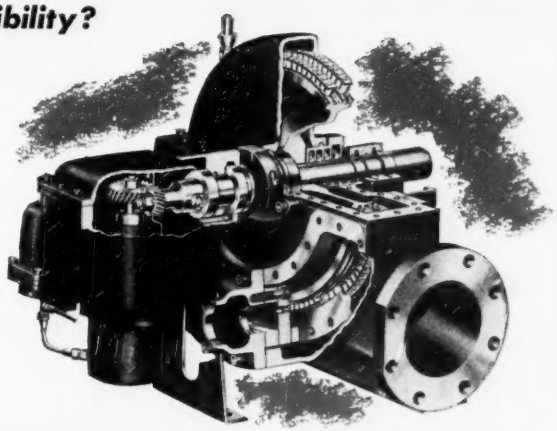
In this typical installation, a G-E Type DP mechanical-drive turbine, rated 30 hp, drives a centrifugal pump. Available in ratings from 10 to 1200 hp and in speeds from 1000 to 5000 rpm and higher, these drives have many other food-plant applications. Use them to drive compressors, grinders, blowers, separators, fans and other rotating equipment.

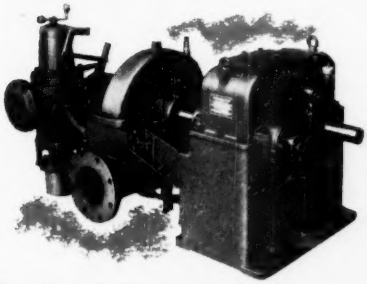
And How's This For Drive Flexibility?

With the Type DP turbine, re-location is easy when modernization calls for changes in your plant layout. Shaft height, size of coupling fit, and keyways are identical on all G-E standard, single-stage turbines. Center-line support permits quick alignment, saves installation time.

Speeds can be adjusted easily within a 30 per cent range, and once set, are held within 6 per cent accuracy by the hydraulic governing system. Speed range changes can be made by simply substituting a new emergency governor and a new set of gears on the governor drive.

Horsepower ratings can be increased, by means of a new nozzle plate and valve parts, to meet altered steam conditions or load demands. And for further flexibility, most of the replaceable parts are standardized and interchangeable.





Geared for low-speed savings! For conveyors, elevators and other food machinery to be driven at relatively low speeds, you can save additionally by using G-E Type DP turbines with close-coupled gear, as above. Compact and space-saving, these combined units are available in gear ratios up to 10 to 1.

WANT MORE DATA?

General Electric Company, Section A652-5
Apparatus Department, Schenectady 5, N. Y.

Please send me your bulletin GEA-4955A, which describes G-E standard Type DP mechanical-drive turbines.

Bulletin needed for: ☐ Reference purposes
☐ Planning immediate project

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The COMPLETE Line of 3A STANDARD SANITARY FITTINGS — VALVES

(Tri-Clover offers many exclusive additions to this line . . . some of which are included below)

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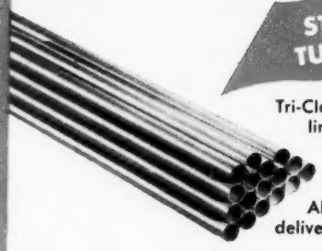
PUMPS
NEW "PUMP KING" SANITARY PUMP . . . ONE OF THE COMPLETE LINE OF TRI-CLOVER CENTRIFUGAL PUMPS



STAINLESS STEEL TUBING AND PIPE

Tri-Clover now offers the most complete line of stainless steel tubing and pipe, in all popular stainless analyses, and in a full size range, polished or unpolished. All types available on "out of stock" delivery basis.

SUPER SPEED Tools

Vise and Expansion Blocks . . . hold Ferrules securely for expansion and facing of tubing.

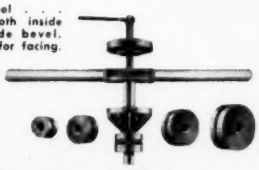
ASSEMBLE YOUR SANITARY LINES WITH THE EXPANDED METHOD . . . THE ONLY APPROVED 3A STANDARD ASSEMBLY

Costly, messy leakage of your product from worn, improperly seated sanitary fittings can be eliminated quickly, easily and at very low cost . . . by using Tri-Clover *Super Speed* Tools to service all sanitary lines. Features: Leak-tight joints . . . 60% faster, easier installation and maintenance . . . longer fitting life. (Partial line of tools illustrated—send for catalog.)

Torqometer . . . Provides easy expansion, through predetermined inch-pound pressure.

Sawing Vise . . . used in common bench vise to secure fast, accurate tubing cuts.

Expanders . . . Simple, efficient tools for accurate expansion, even with inexperienced personnel.



Seating Tool . . . Provides both inside and outside bevel. Also used for facing.

EXPORT DIVISION — 8 So. Michigan, Chicago 3, U. S. A.

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THE *Complete* LINE

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THERMO KING TRUCK REFRIGERATION CUTS SHIPPING COSTS FOR Seabrook Farms

"Since installing THERMO KING units on ten of our reefers, we have done away with all inside roof coils, and eliminated condensation drip which had been a problem. Our maintenance costs are much less than for previous refrigeration systems. We can depend on THERMO KING to fully protect the loads of Seabrook Farm Frozen Foods at all times."

—Harold C. Emerson, Director of Traffic
Cumberland Auto & Truck Co. (Carriers for Seabrook Farms)

More than sixty-five million pounds of quick-frozen fruits and vegetables are packed by Seabrook Farms annually! Most of this tremendous load is carried by the Cumberland Auto & Truck Co. Both carrier and shipper have found that THERMO KING Mechanical Truck Refrigeration does the best refrigeration job . . . does it more economically, more efficiently!

CHECK THESE MAJOR THERMO KING ADVANTAGES

- **Automatic Temperature Control**—cools and heats—maintains proper temperature regardless of outside temperature.
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- **Economical**—costs only a fraction of a cent per mile to use.
- **Low weight, large capacity**—units weigh as little as 600 pounds, provide thorough refrigeration.
- **More pay load space**—units occupy less than 8 cubic feet of normally unused space.
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Take full advantage of Crucible's half century of specialty steel leadership — leadership based on a keen devotion to detail . . . on every Industry-posed problem . . . whether the order is in tons or pounds. When you think of stainless . . . call in Crucible. CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

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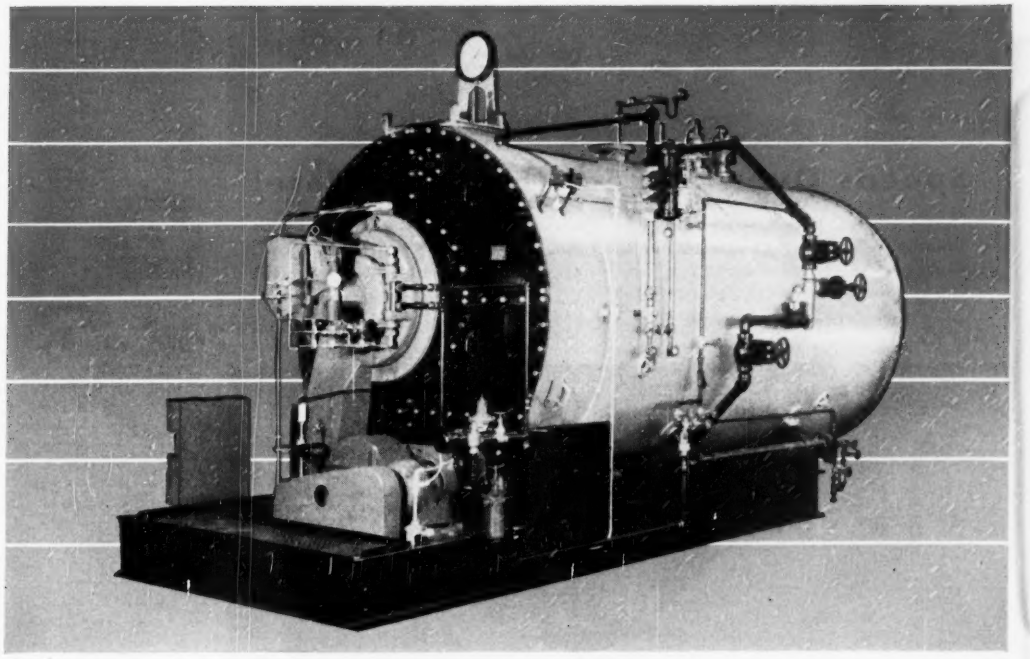
. . . Another Reason Why You Get A Greater Return From Your Investment In A Cleaver-Brooks Steam Boiler



Nothing is more important than dependable operation of your steam boiler — vital to such operation is proper maintenance and service.

Cleaver-Brooks steam boiler service facilities are national — through factory-trained and authorized service organizations. Service begins with starting of your new boiler. It is placed in operation and fully tested under load by Cleaver-Brooks service-representatives. Your operators are trained in operation, care and maintenance.

Burn the available fuel in your area — gas or oil — with equal efficiency: Through their high heat transfer Cleaver-Brooks boilers operate at a guaranteed efficiency of 80% from full load down to 30% of rating, burning gas, oil, or combination gas and oil. No high or costly stacks (a simple roof vent carries off combustion gases)—no special foundations needed. Fit low head-room areas — provide quick steaming, flexible operation to meet fluctuating loads — eliminate ash handling. Cleaver-Brooks boilers fully meet all codes — available in sizes 15 to 500 H.P. — 15 to 200 P.S.I. Write for new, just published catalog.

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For Duffy-Mott Company, Inc.

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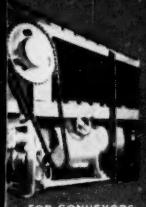
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On thousands of applications, stepless variable speed operation assures exactly the right speed for every operation . . . for each operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a better quality product and more efficient performance of your equipment and your operators.

ALL-METAL Master Speedrangers provide infinitely variable speed in an all-metal unit. This all-metal construction gives you greater compactness and durability than you can get from any other variable speed drive.

variable speed operation doesn't cost IT PAYS

SIMPLE COMPACT DESIGN The design is extremely simple, consisting of a metal ring which operates at a variable position on the two driving and two driven cones. The position of the ring on the cones determines the speed of the output shaft.

EXTREME FLEXIBILITY Speedrangers can be supplied for single phase, polyphase, or direct current operation. They can be furnished also with integrally built gear reduction units and electric brakes . . . in enclosed, splash proof, fan-cooled or explosion proof construction and for a wide variety of mounting arrangements.

HORSEPOWER Available in sizes up to and including 5 horsepower.

SPEED RANGES Up to 9 to 1 are available. (Up to 15 to 1 in some sizes.)

For additional information on how the Speedranger works and what it can do for you, write for Data 7525.

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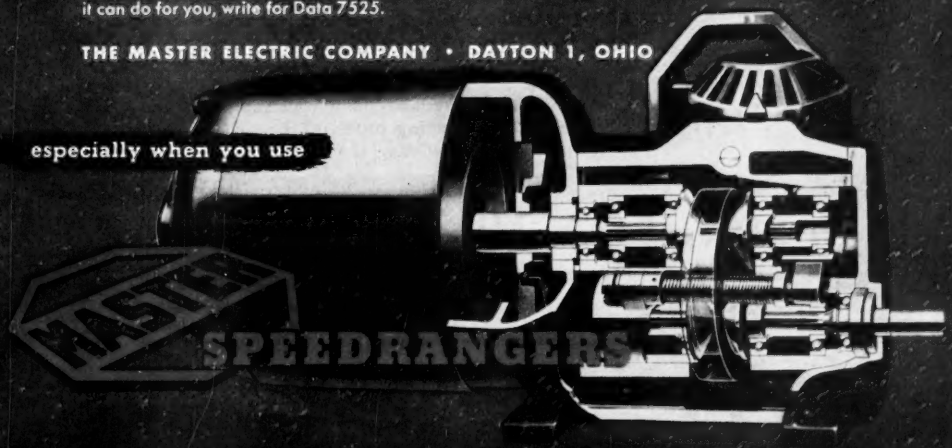

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SIMPSON Mix-Mullers are built in 10 sizes, from 1/5 to 50 cu. ft. capacities. Available in stainless steel and other corrosion-resistant materials. They may be equipped with oil, steam or water jackets, and for mixing under pressure or vacuum.
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In order to make sure that users will get perfect results *every time* they bake, more and more producers of cake mix—doughnut mix—and similar food products are using Simpson *Mix-Mullers* to turn out completely blended mixes of unvarying quality. These versatile mixers, utilizing the proven *mulling* principle of controlled mixing, offer a positive method for processing scores of food products *better, faster, at lower cost.*

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- ✓ **FULLY AUTOMATIC CLUTCH AND TRANSMISSION. No gear shifting. No levers.**
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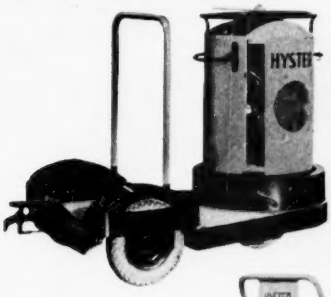
- ✓ **AVAILABLE IN VARIOUS SIZES.**



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Tows trailer trains up to 15,000 lbs. Most maneuverable towing unit on the market.

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Capacity 4000 lbs. Low platform makes bulky or heavy cargo handling easy.

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Transports loaded pallets weighing up to 4000 lbs. Available in several fork lengths. Hydraulic fork lift.

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Handles loads of 4000 pounds on skids or tote boxes. Available in several lengths and widths. Hydraulic platform lift.

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FOR HORIZONTAL MATERIALS HANDLING

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Hundreds of Turret Trucks are in use. They are low in first cost, low in operating cost, high in job performance, are extremely simple to operate.

HYSTER *Salsbury* Turret Trucks are sold—and more important — serviced by Hyster dealers all over the world. Ask for a demonstration. Or mail the coupon for a copy of the Turret Truck catalog, just off the press.

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Please AIR MAIL copy of the new HYSTER *Salsbury* Turret Truck catalog.

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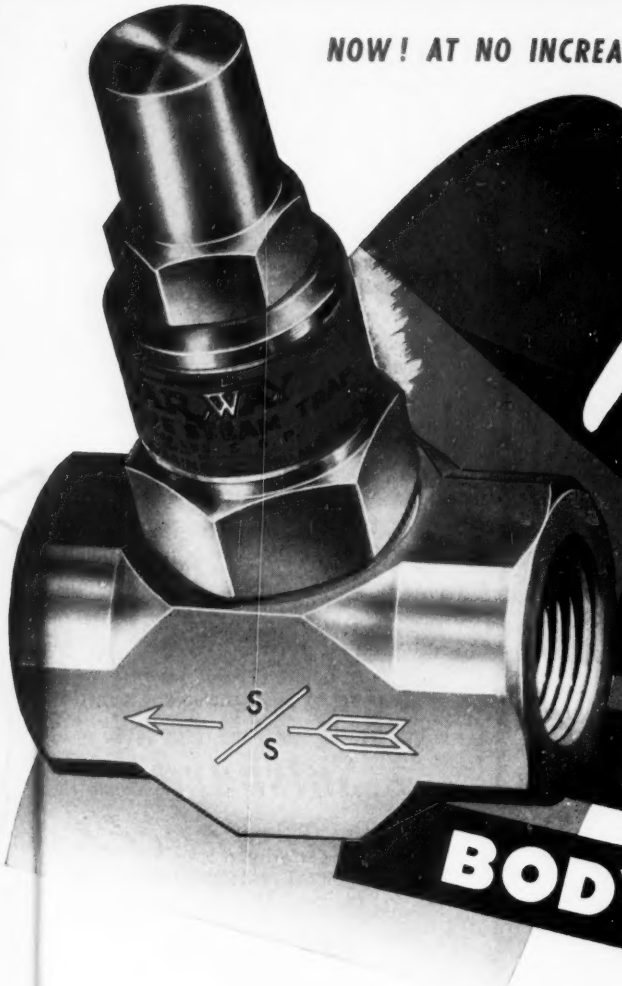
Manufacturer of a complete line . . . HYSTER fork-type Lift Trucks, Straddle Trucks and Karry Kranes — 2,000 lb. to 30,000 lb. capacity; HYSTER Salsbury Turret Trucks — 4,000 lb. capacity.

NOW! AT NO INCREASE IN COST TO YOU



NEW! STAINLESS STEEL BODY

Makes a good steam trap better

Nearly 650,000 Yarway Impulse Steam Traps have already been installed—proof that they are doing a good job.

Now a *stainless steel* body makes this famous little trap even *better—at no increase in cost.*

Better in *wear*, better in *service*. Users will find Yarways require less maintenance than ever. All parts are wear-resistant, practically wear-proof. There is only one moving part, a small, stainless steel, heat-treated valve. Important, too—Yarway Impulse Traps are *suitable for all pressures up to specified maximum without change of valve or seat.*

Other popular advantages are *small size, light weight, easy installation* and *low cost.* Often it costs *less* to buy a new Yarway trap than to repair an old, ordinary trap.

In performance—ask any user. They all say Yarways are the traps that *get equipment hotter sooner and keep it hot!*

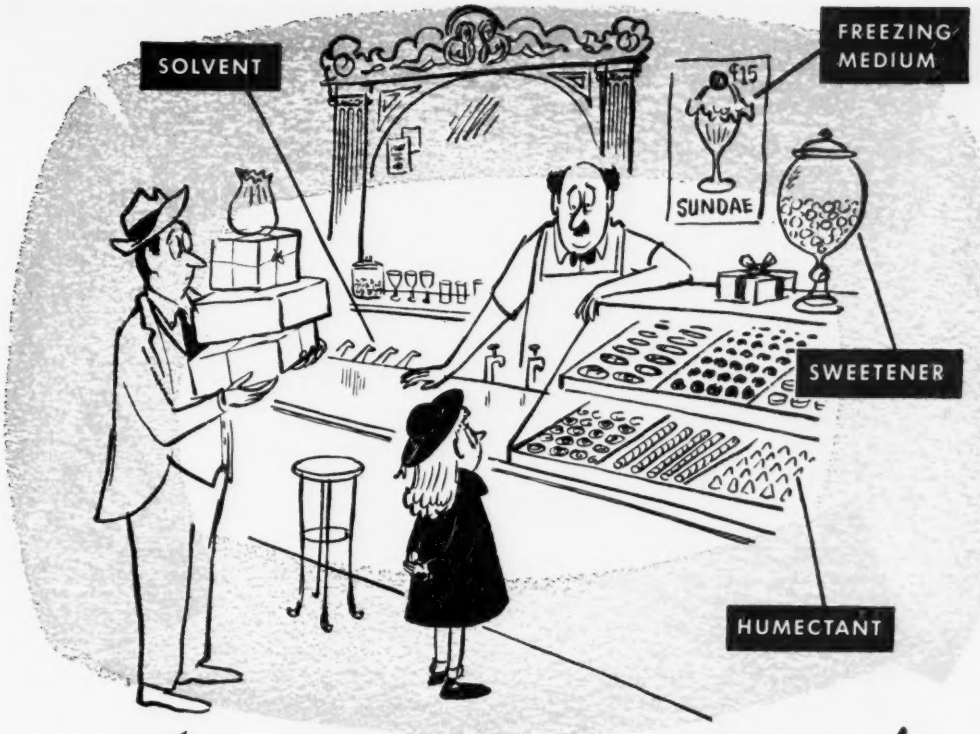
For better steam trap performance, try *new* stainless steel Yarways.

YARWAY IMPULSE STEAM TRAPS ARE SOLD BY OVER 200 DISTRIBUTORS. THERE IS ONE NEAR YOU.

Write for name and address.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

YARWAY IMPULSE STEAM TRAP



If you value freshness... try Glycerine!

TODAY'S consumer—like this youngster—sets a high premium on *freshness* in foodstuffs! That's why U.S.P. Glycerine is called upon so frequently—to maintain freshness, good appearance, and palatability, and to prevent excessive drying, crumbling and graining in many food products. Then too, versatile Glycerine is an effective sweetener . . . a solvent in flavoring agents . . . a humectant in confectionery creams . . . and a non-toxic freezing medium—widely used in candies, ice cream and food staples! Whatever its application, U.S.P. Glycerine can be used with absolute confidence in food processing, because it is *safe*, edible, and actually nutritious when digested! Why not brush up on the role Glycerine plays in your business? The attached coupon will bring you a copy of "*Why Glycerine for Foods?*"—describing well-known Glycerine applications in a wide variety of food products.

TOMORROW—there's a bright future for U.S.P. Glycerine not only in the realm of food processing—but also in food packaging. It is already recognized as an essential plasticizer in the manufacture of sausage casings, wrapping materials, and the like—and every indication points to wider use of Glycerine for improving the properties of coatings applied to food containers. A recent paper describes a Glycerine-containing formula for producing a water-soluble varnish that's especially suitable for coating metallic surfaces of food containers. The resultant baked films are said to be definitely improved in moisture and heat resistance and freedom from tackiness as compared to films obtained from alcoholic solutions. Further details will be sent on request. (Please use your company letterhead.) Here's another good reason why—in food processing and food packaging—*nothing takes the place of Glycerine!*

Nothing takes the place of Glycerine

GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue, New York 17, N. Y.

PLEASE SEND A COPY OF 8

"WHY *Glycerine for Foods?"*

Mr. _____

Title _____

Company _____

Address _____

City _____ Zone ____ State _____

When you want the BEST go to the BEST

And for Packaging it's GLASS

The transparent glass package displays your products with all their colorful eye and appetite appeal. High in chemical durability, it does not change their taste or aroma, will not rust, corrode or leak.
Easy to open, easy to use, easy to reseal to protect unused portions, it makes the most convenient package. It lends itself to individuality in size and shape, hence is adaptable to any product.
Preferred by consumers because it is sanitary and convenient . . . by retailers because of its sales and merchandising advantages.
Anchor Hocking Glass Corporation, Lancaster, Ohio.

Anchorglass*

TUMBLERS

Jellies, jams and preserves lend themselves to tumbler packaging . . . particularly in strong, well designed *Anchorglass* Tumblers. They are the result of consistency in manufacture, uniform distribution of glass, proper annealing and strict quality control from selection of raw materials to finished products. A number of popular styles and capacities are available, one or more of which, we feel sure, will fit your packaging needs. But regardless of what you package there are *Anchorglass* Containers in styles, capacities and colors that will meet your requirements.

ANCHORVAC*

T CAPS

Anchorvac T Caps are used for sealing either thin blown or thin pressed tumblers having straight, flared or bead finish sides. They are suitable for vacuum sealing, hot packing and for sterilization or processing after sealing. Their loose fit before sealing permits speed in application and drawing of vacuum. *Anchorvac* T Caps can be applied with *Anchor* Sealing Machines at speeds ranging from 20 to 125 per minute. They are available in 8 sizes ranging from 54 to 77 mm. Let us tell you more about *Anchorglass* Tumblers and *Anchorvac* T Caps.

*Reg. U. S. Pat. Off.

For the BEST in Glass Packaging *it's*

ANCHOR HOCKING

"THE MOST FAMOUS NAME IN GLASS!"

Call us for steel

We ship quickly!

EVERY KIND IN STOCK

BARS, CARBON STEEL—Hot rolled and cold finished, rounds, squares, hex's, etc.

STRUCTURAL SHAPES—Channels, angles, I and H beams, etc.

PLATES—Sheared, U. M. and mill edge, many types incl. abrasion resisting, E-Z-Cut, etc.

SHEETS—Hot and cold rolled, many types and coatings, cut to exact sizes.

TUBING—Seamless and welded mechanical and boiler tubes

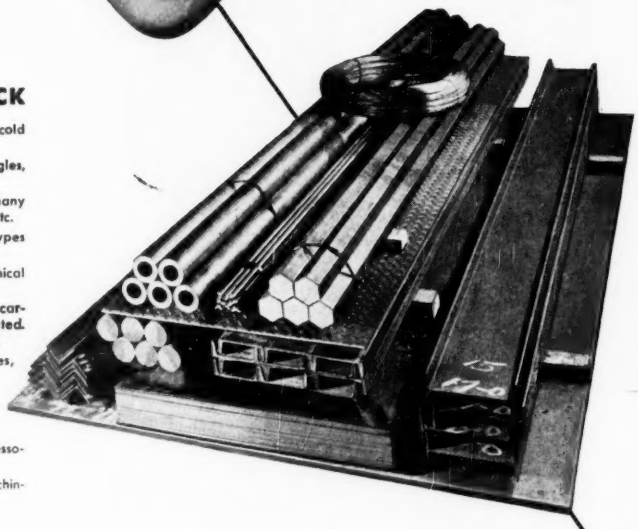
ALLOY STEEL—Low, medium and high carbon alloys, as-rolled, annealed, heat treated. Also tool steel, oil and water hardening.

STAINLESS STEEL—Allegheny bars, plates, sheets, tubing, pipe and fittings, etc.

INLAND 4-WAY SAFETY PLATE—For flooring, ramps, stair treads, product applications, etc.

REINFORCING STEEL—Bars and accessories, spirals, wire mesh, etc.

OTHER PRODUCTS—Babbitt metal, machinery and tools for metal fabrication



RYERSON STEEL

RYERSON CERTIFIED STEELS

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

JULY, 1950

Food Industries

New Research Facilities Mark Significant Trend

At the turn of the century, W. K. Vanderbilt constructed a palatial 100-room home at Oakdale, Long Island, complete with a bachelors' wing, indoor tennis court, palm room, promenade, ballroom, and other luxurious but economically useless facilities.

On June 2, 1950, National Dairy Products Corp. dedicated its great new laboratory at Oakdale, marking the conversion of the Vanderbilt estate to the most creative and constructive activity known to man—fundamental and applied research.

Here we have a dramatic example of the direction in which the affairs of man are moving. More specifically, we have typified in the size, scope and purpose of the Oakdale research facilities a significant new trend in the field of food processing.

National Dairy's Long Island laboratories include more than 85,000 sq. ft. of floor space, on 90 acres of land, in an environment ideal for effective research—isolation conducive to original thinking, and inspiring surroundings which stimulate the imagination. The layout includes 48 individual laboratories and two pilot plants, with room for expansion. No less than 230 scientists and technologists at the labs are working on the technical frontiers of food production and processing.

Here are some of the projects on their program: (1) Basic research in human and animal nutrition. (2) Improvement of plant operations. (3) Research and technical service pertaining to milk production. (4) Improvement in the quality of dairy products. (5) Research to develop wider use of byproducts.

In short, these laboratories are "dedicated to a wider use and better understanding of dairy products . . . as a base for the development of new products and materials . . . as a source of health and enduring progress on the farms and in the towns and cities of America." The quote is from the National Dairy policy as established 10 years ago by President L. A. Van Bomel.

If any further testimony is needed as to the significance of this development, it is found in the fact that outstanding national figures participated in the dedication ceremonies, and 300 leaders in science and industry attended the affair. Among the speakers were Karl T. Compton, MIT; Fairfield Osborne, Conservation Foundation; Charles Glen King, Nutrition Foundation; and Louis Bromfield, author and conservationist.

We have gone into some detail to picture the scope and significance of these research facilities and plans. And to get the overall food industry picture, you magnify the National Dairy setup by several diameters. The dairy company itself has two other major research centers. Big new labs have been built by National Biscuit, Armour, Wilson, and National Canners Association. Not so new, but still outstanding, are the Central Laboratories of General Foods. And Swift, General Mills, Pillsbury and others have long had big research programs.

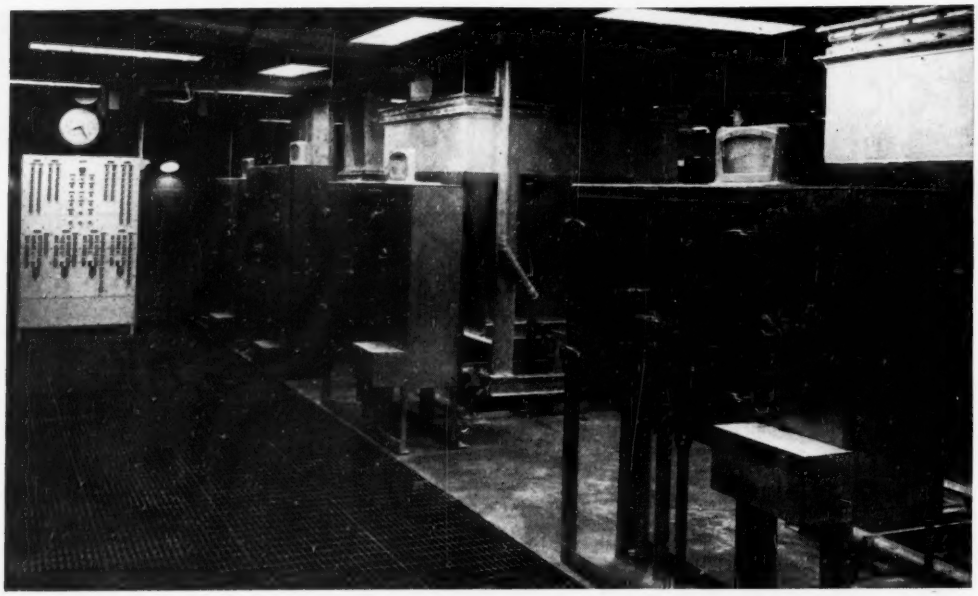
So here you have represented well-directed and equipped operations whose activities today will mean more business and larger profits tomorrow—through new products, better quality, and lower costs. Their benefits will be enjoyed all the way from farmer to consumer. And the impact will be felt by food processors who do not keep abreast of progress. So those food firms not large enough to finance major research projects should at least have on their payroll technical men who can utilize new information developed elsewhere.

As a whole, the food industry lags behind many other industries in the amount of research done. And a pertinent point was made by W. Rupert MacLaurin, economics professor at MIT. While praising the new Oakdale facilities, he noted that they seemed small compared to similar labs in other fields, such as steel.

But the significant thing is the trend. And scientific trends are long-lasting, snowballing phenomena which roll over those who do not go along with them.

—F. K. LAWLER, *Editor*

Where Push of a Button Does the Job



FROM MASTER PUSHBUTTON control panel (left, rear) in this modern dry-mix food plant, operator directs entire batching operations. Mix ingredients are automatically weighed in battery of scales (right).

Tip on a Good Buy—Modernize Now!

At today's prices, investment of $14,000 per man saved pays off in three to four years. Going automatic brings extra benefits at low added cost

OGDEN JOHNSON
Project Engineer,
Ford, Bacon & Davis, Inc., Engineers
New York City

New processing methods and improved equipment can comprise a better purchase at present prices than was the case 15 years ago.

So, there arise the questions: "Just what does it cost to modernize a food processing plant? And at what point will the investment be profitable?"

Our experience indicates that equipment investment can logically be made today with an expenditure of from $10,000 to $14,000 per man saved. For even at such figures the savings should pay off the investment in three or four years. The sharp increase in labor rates alone over the past 15 years will confirm these facts.

Management is first concerned with profits. An investment in modernization is frequently the soundest way to increase earnings. But the development of automatic plants with complete mechanization of material handling also has long range social benefits.

As the average age of our workers increases, they are less able to undertake hard manual tasks. But, their mental facilities, their judgment and dependability are unimpaired, often improved, at an age when their physical output is restricted. Operators in automatic plants are preferably the older, proven workers. The trend toward pushbutton control will extend the productive period of our working population.

Costs More Than Doubled

Wage rates in 1950 are more than double the rates in 1935. Actual labor costs based on output are even higher. Plants built only a decade and a half ago were designed on wage rates which averaged 60c. per hr. The yearly cost for a worker, including overhead, then amounted to about $1,600. Taking an average rate of $1.25 per hr. for present day operations, the annual cost with a higher overhead than in prewar days will run about $3,600.

The accompanying table on average wage scales for various food processing, compiled from data by the Department of Labor, points out quickly the sharp and continuing rise in labor rates.

In the course of a study we recently made for an industry producing a wide range of apparatus, it was demonstrated that the most stable products in the line called for major revisions in production in seven years and for the average products, major revisions in five years. This reflects the changing conditions in the food and other processing industries, because the demand for improved equipment came from them.

Enterprising managements, becoming aware of this short time cycle, plan to pay for their modernization out of labor savings over a period of three to

four years. The simple facts have a major bearing on the design of the modern plant. It means that a program of modernization, amortizing equipment in such a short range of years, can afford to budget $10,000 to $14,000 in plant investment for every man saved in the change-over.

How does management know that a plant or a production unit is obsolete? Generally, some alert executive in one company initiates an improvement, thus creating competition that forces modernization on the rest of the industry.

In some of the major mass production industries, methods departments maintain a continuous check on such problems. And this trend is now taking hold in the food and other processing industries, where periodic surveys are made at frequent intervals to weed out the unprofitable practices.

Now—while profits are up—is the time to modernize. Your company will then be in a favorable position to meet the more severe competition as it develops in the future. The best evidence of this thinking is found in the several recent announcements of new automatic processing plants.

Why do modern plants appear to be so expensive? In a new plant which we designed, the basic production equipment—the core of the operation—cost about $300,000. If the prewar wage scale, of 60c. per hr., could have been maintained, production might have been a profitable operation using this basic equipment.

Actually, the entire production equipment installed cost $950,000. The difference was in labor saving equipment designed to eliminate manual workers at an average hourly rate of $1.25. In this instance, the average capital expense was about $8,000 for each man saved.

This equipment will be paid for in manpower savings alone in about two years of normal plant output. Even at a production rate running 60 percent of the normal forecast, the man-savings would repay the investment in less than four years.

Problems Found Common to All

When an industrial engineer surveys a modernization problem for a processing plant, he finds that many problems are common to the entire industry. Most material handling has the same essentials. Raw materials, both dries and liquids, must be received, then fed into the process, and finally, the resulting finished goods, usually packaged, must be warehoused and shipped out.

Processing operations require a careful examination, but many steps are duplicated in all food processes, such as combining or batching ingredients, mixing, heating, cooling and conveying. The design of the modern plant is all in the direction of the automatic operation, not only to save operating labor but also to eliminate human inaccuracies and to improve the product.

This breaks down into two major phases: Mechanical handling of materials, and electro-mechanical control of process operations. The resulting plant, when fully mechanized, is largely operated by pushbuttons with interlocking controls to insure accuracy and dependability, with a minimum of human errors.

The food industries are faced with variables in process conditions and raw materials, both of which affect product quality and in some cases result in rejection of finished goods. Optimum process conditions can be maintained by using electro-mechanical controls, and thus production of uniform quality products can be assured.

Bulk Handling Advantages

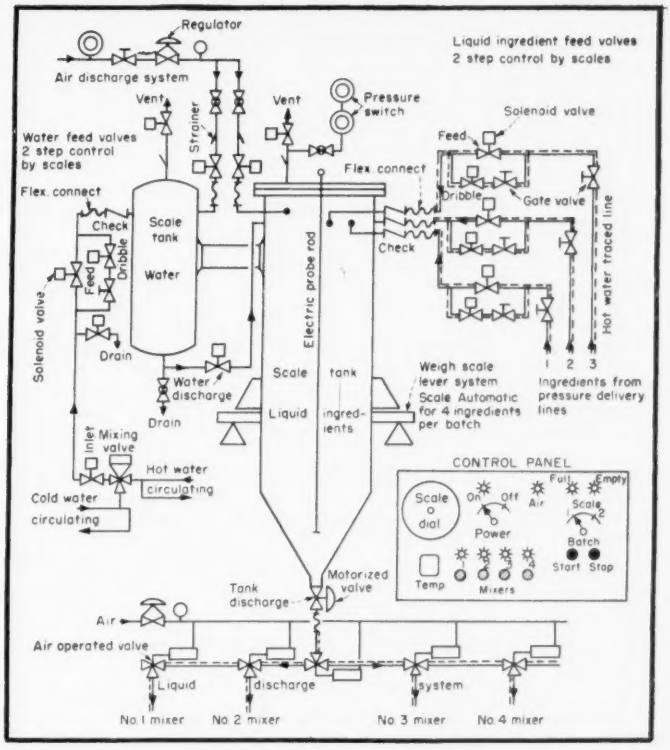
The best way to save labor on incoming materials is not to manually handle them at all. This can be done if the material is received in bulk rather than in packages, such as bags or drums. When bulk material is received, it can be put directly into a conveying system and delivered right to the process, or to storage bins or tanks prior to the process.

This handling method has a second advantage—in purchasing, since materials can be bought cheaper in bulk. The supplier, through the elimination of containers and packaging costs, is able to sell his product at a lower price.

A well-known candy plant receives virtually all of its liquid ingredients in tank cars and its sugar in bulk hopper cars. There is no labor involved in the handling; the cars are simply connected to the conveying or transfer pumping equipment which delivers to the process equipment.

In a new plant of our design, flour, the principal ingredient used, is delivered directly from the nearby flour mill by pneumatic conveyor to the process storage bins. Screw conveyors from the bins deliver this ingredient to the process. All manual handling is eliminated. On a daily consumption of 100 tons, this installation saves 13 men with an equipment investment of about $9,000 per man.

One Illustration—Automatic Batching of Liquids



When materials must be received in bags or drums, the preferred method is to convert to bulk conditions as close to the receiving point as possible. Older methods may require as many as 1¾ man-hours per ton of material handled, while the new methods may reduce this to as little as ½ a man-hour per ton.

In a recently completed plant, bagged dry ingredients are unloaded onto pallets and moved directly to a central feed-in point. Here, the material is dumped from the bags into the conveying system that delivers it to the ingredient storage bins, ready for the process requirements. As for the liquids, those in drums are dumped at a central point. The rest, received in tank cars, are pumped to ingredient tanks ready for use in the product.

Compared with the operation which this system superseded, in which bags and drums were hand trucked to the point of use, these newer methods saved 19 men with an investment for equipment of about $11,000 per man.

On the old-type production lines, where the methods are traditional, there is reliance on the experience and good judgment of operators who grew up in the business and who are hard to replace. However, the more the reliance upon the human element, the more the chances of mistakes. And on such production lines the products have to be checked constantly for quality.

But improvements in equipment and in control instruments have now taken much of the guesswork and also most of the labor out of the processing. When the ingredients are in bins or tanks, readily available for the process, automatic proportioning can be applied. Where the formulation is somewhat involved, batch processing may be the preferred method.

Ingredients—dries, liquids, or both—are fed automatically to batching scales, which then deliver them to the next processing step. Continuous mixing may also be employed if runs are of sufficient duration. Here, automatic feeders draw ingredients from bulk storages and deliver them in proper proportions for use in the product being formulated.

Time and temperature controls maintain the predetermined conditions, and the quality of the resulting product remains constant. But, the resulting labor saving due to the elimination of manual weighing of ingredients, adding them at the proper time, mixing and heating, and rehandling from one process step to the next, is worth the investment aside from product improvement.

In one of our new plants, the processing equipment receives ingredients from the bulk handling and conveying apparatus, proportions and incorporates each item in an automatic batching process, and delivers the finished product without any manual handling. Twenty-seven men were saved by adding, to the basic units, automatic equipment costing about $8,500 per man including installation.

Eases Step to Fully Automatic

When a plant has been set up on the basis of bulk handling of materials and the processing lines have been arranged for mechanical rather than manual operation, the final step of providing for fully automatic operation is not too difficult or too expensive to accomplish. In the older plants, operators were stationed at various control points, where sampling of the product and readings of various gages, thermometers, and other instruments indicated what action they needed to take to continue the process.

In the modern automatic plant, the instruments may be grouped at central control boards. The addition of timers, relays, and other control components, may correlate various steps in the process and interlock the control operations so that the requirements of each step are satisfied before the next step is started. Largely a matter of design experience, this calls for using instruments and control units of standard manufacture in combination to obtain the desired results.

The control circuits actuate valves, conveyor motors, and the like, in precise sequence. The control board operator supervises the operations by observing the process indications. In case of any failure in the equipment or controls, the process stops and the operator may then take over on an emergency manual basis until the fault is corrected.

With proper design and maintenance, the whole operation can be as reliable as the familiar pushbutton elevator in the modern office building.

How Automatic Controls Are Used

This final step in developing a fully automatic plant requires a very thorough study of process requirements and meticulous care in design. It is to be noted, however, that cost of instruments and apparatus to accomplish the result is often justified in manpower saving alone, aside from important, if less tangible, savings in process time, along with economies through improvements in product uniformity.

The flow chart accompanying this article illustrates how automatic controls are applied to one group of operations in a process. Here, water and three other liquid ingredients must be added to batch mixers in exact quantities under precise temperatures and time controls. And two different batches requiring different quantities must be run as required. Employed is an automatic scale capable of weighing four ingredients in sequence in each of two batches. It has mounted on its lever system two scale tanks, one for water and one for the other liquids.

At the beginning of a run, the individual weights of the ingredients for each batch are set on the scale. Then the ingredient temperatures are checked and the water temperature adjusted on the mixing valve to produce the desired final temperature of the ingredients when delivered. Then the operator, stationed at the control panel, selects Batch No. 1 and pushes the "S" (start) button.

The scale, through the electrical controls, first operates the liquid ingredient feed valves in sequence, admitting exact quantities of each ingredient to the scale tank. The scale then operates the water feed valves, first opening the water inlet and drain valves.

After a short, timed interval, when the mixing valve has stabilized the water temperature, the drain valve closes and the feed and dribble valves open, admitting water to the scale tank in exact quantity and temperature. When the required weight of all the ingredients has been fed into the scale tanks, the scale's "Full" light glows and the scale control automatically closes the tank vent valves and opens the valves on the air discharge system.

This puts the scale tanks under air pressure, the first pressure switch

(*Turn to page* 169)

Wages Jump—Sharpening Focus on Advanced Technics

TABLE—AVERAGE EARNINGS (Cents per hour) for Production Workers in Major Food Processing Industries

Classification	1935-'39	June 1949	January 1950
Baking	62.1c.	123.9c.	127.2c.
Canning	46.4	111.3	118.3
Confectionery	49.2	108.1	107.5
Dairy	...•	120.6	124.6
Flour and grain	60.5	129.1	136.0
Malt liquors	91.6	168.0	172.8
Meat Packing	68.6	139.7	142.2
Sugar refining	63.6	136.3	141.0

Note: Average of all food processing industries for 1935-39 period was 60.7c.
• Earlier data on Dairy did not include evaporated milk and cheese manufacture, hence comparable figure not available.

Old

New

CLASSIC SIMPLICITY dominates redesign (right) of Monarch labels by Robert Dickens, Chicago designer. Brand name and food vignette are brought into prominence, and front is cleaned up. Back is utilized for serving suggestions.

Does Your Label Need Redesigning?

These pointers on color, layout, and printing technics—together with tips on tie-in appeals and consumer angles—will help you decide

HOWARD JACOBY
Editorial Assistant, "Food Industries"

Stiff competition, particularly in today's self-service supermarkets, makes it imperative that the food packager know the "ingredients" of good point-of-sales appeal in a label. With such knowledge, he can quickly evaluate the selling effectiveness of his own label. And if it's found wanting, he will know what to do.

Just how important is a package label? Says Jim Nash, New York specialist in food package design: "With the increasing number of self-service stores, the package is its own salesman, and with the elimination of display advertising in the stores, the label on the package is its own point-of-purchase promotion. In short, the package and its label must become the focal point of the entire sales and merchandising program."

While he need not be his own label designer, the modern food plant man does need a working knowledge of the essentials of label design to go along with his overall know-how of the packaging field.

For simplicity's sake, let's break down the label into its components: An ideal label consists of the best possible combination of color scheme, layout, and printing, plus tie-in appeals for all forms of advertising and promotion.

The first named ingredients—color tones and combinations—were ably covered in last month's FOOD INDUSTRIES' article, "Do Your Package Colors Hit the Target?', written by Howard Ketcham, color and design engineer.

The theme of the article was that color can do many things for a food package and label, some of which may be overlooked by food men. To wit, color commands attention, portrays the product and its functions, builds brand recognition, adds eye interest, promotes prestige, has emotional appeal, stimulates sales personnel, and makes the label easy-to-read.

Of particular interest is a knowledge of good and bad color combinations and specific reactions caused by different shades of color (see tables on page 41 of June FI). You know the impression you want your label to make. Now decide whether its colors "do hit the target."

Role of Good Layout

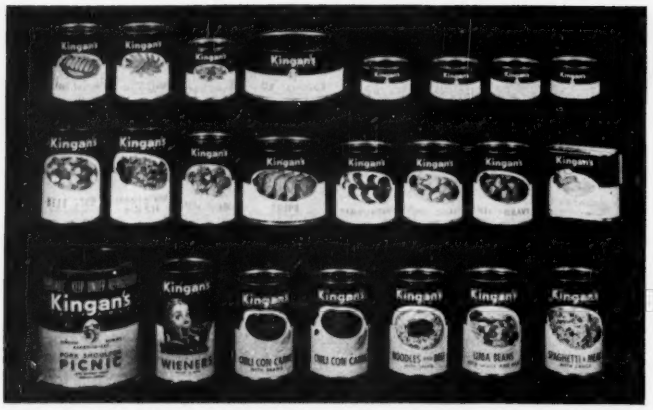
Most label designers will agree that a good label should: (1) Encourage quick product identification; (2) promote appetite appeal; (3) provide for repeat recognition; and (4) describe the product fully and clearly.

Designers further state that these objectives are being accomplished today by a return to simple, clean-cut presentation. Fancy typefaces, hodgepodge designs, and myriad colors are fast becoming obsolete. Gerald Stahl, New York package designer, puts it this way: "There is a growing emphasis on clarity, simplicity, and legibility, rather than tricky design or artistic gymnastics, to gain point-of-sales impact. I believe that clean, but forceful and imaginative, packaging gains its greatest shelf display by presenting a short, understandable sales story."

The food packager should take a critical, unprejudiced look at his label and decide whether it is a help or a hindrance to the buyer. If it's the latter then the expert advice of a label designer is in order.

Another way to evaluate your label is to weigh its features. Consider the case of Monarch giving the symbol of a lion's head such prominence on its old label that it covered half the picture and vied with the brand name for attention (see photo). A consumer

Line Theme, Tie-in, and Repeat Recognition



ATTRACTIVE DISPLAY and brand recognition feature redesign of Kingan labels by W. McVaugh, Pendleton, Ind. Top is royal blue, bottom bright yellow.

TIE-IN APPEAL between package label and truck side for Borden Co. was idea of Frank Gianninoto, New York designer.

CLEAN, EASILY REMEMBERED label-front and delicious back panel picture with serving hints keeps cracker sales up. Design by Jim Nash, New York.

survey showed the symbol to be only the fifth most important element on the label (first four were brand name, food vignette, name of food, and specific information on product use). Needless to say, redesign of the label brought a demotion for the king of beasts.

So you see, it is very easy for a label to be featuring the wrong thing. Hence, ask your salesmen to be on the lookout for any consumer reactions that will give you a hint as to what customers expect from your label. If you suspect your present label may be a little off base feature-wise, re-design is definitely indicated.

Here are a number of other specific suggestions that may help you spot a deficiency in your label:

A good label can be identified from the other end of the store. Can yours?

The consumer wants to know exactly what's in a package as quickly as possible. Does yours tell him?

Many consumers are interested in the legal and other informative matter concerning a product. Is it complete and readily found on your label?

The housewife often needs a little help in just how to prepare and serve a particular product. Does your label tell her?

Printing Technics

A good method for reducing label costs without impairing quality employs a master design for an entire line of food products, or at least as many as practical. By grouping labels of the same color on one press run, reproduction costs are cut. But each product has its own individual problems—and these should be considered individually. Savings can be made, however, where production requirements are parallel.

Many a smartly colored, well-styled label defeats its purpose because it is printed on cheap box board or unvarnished paper. Recently a leading fruit canner was amazed to discover that merely an extra coat of varnish would prevent his white label from becoming finger smudged and stained in handling. Better-quality paper can keep a package looking clean and inviting for the duration of its shelf life.

One printing trick, fast becoming the vogue, is the use of the label-stock color as a free hue. Thus, in effect, you can get a two-color job with one color.

Another thing: The lighting inside retail stores may be fluorescent or incandescent. You'd be surprised how different the same label can look under varying illumination. It's certainly worth a check.

If your product might grease-stain your label, there are a number of lami-

Clean and Simple

QUALITY LOOK is achieved in drug store candy label by Lester Beall, New York designer.

SPACE-SAVING overprint of "A&B" brand symbol smartly ties line together. Gustav Jensen, New York, was designer.

nated label materials that can help you. Cellulose acetate laminates deserve attention.

Unnecessarily fancy type faces are so hard to read they can actually drive the customer away. Proper use of type faces is an expert's job, but you can study your own label to see if it is hard to read or old-fashioned.

Tie-In Appeals

With the advent of television, more attention than ever is being focused on the adaptability of labels for video appeal. And TV is spurring better pictorial effect in newspaper and magazine promotion.

If you're planning a television campaign, it would be a good idea to find out if your label is "video-genic". Incidentally, "ready-to-eat" illustrations on labels are booming. And they can look very good on television. Frank Gianninoto, New York industrial designer, comments that "these 'eat-appeal' illustrations are proving worth their weight in television sets."

Alert food packagers are eye-ing every means of promoting their products with tie-in appeals. One recent bonanza is the painting of truck sides exactly like the label of the product being delivered. Notice Elsie, the Borden cow, beaming happily at you as she moves majestically through the streets. Cartons and cases are also coming in for same kind of treatment.

For an overall gage of labels, here is the vote tallied by the Grocery Manufacturers of America when they asked housewives over the country what they wanted labels to do for them:

86 percent wanted the label "to let them know what is in the package."

85 percent wanted it "to help them get the right product for their particular need."

83 percent wanted it "to help them spend their money wisely."

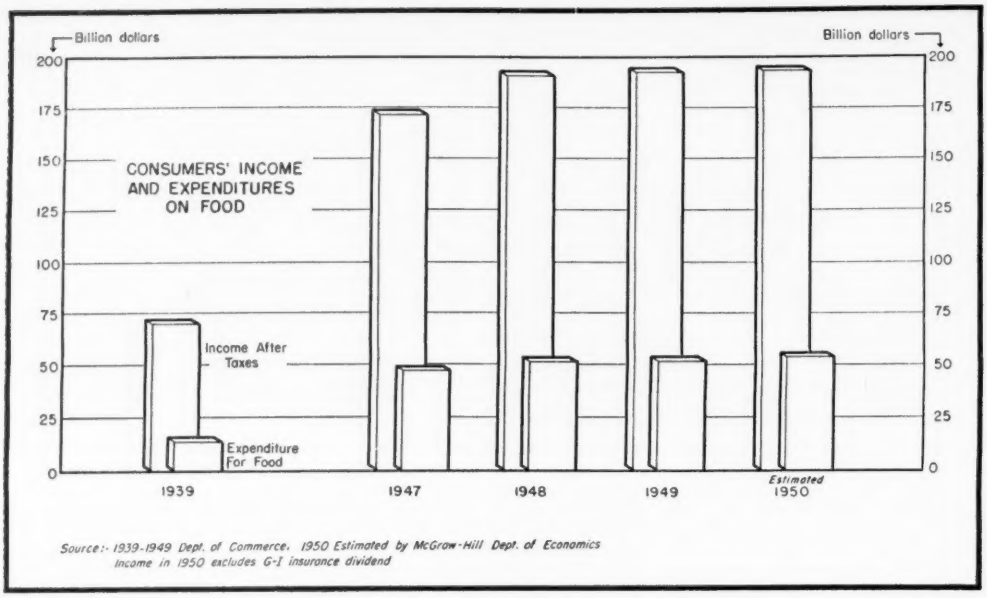
Just remember—the company that does not key its label's color, lettering style, illustration and layout to the buying impulses of the public pays the costs of the company that does.

Printing and Paper Stock Angles

OPAQUE and transparent inks feature Pliofilm bag. Design by Walter Landor.

CELLULOSE ACETATE laminated with white stock keeps Swanson's wrap-around labels clean and shiny. Symbol promotes quick identification.

Consumer Food Spending Stays High



Source:- 1939-1949 Dept. of Commerce. 1950 Estimated by McGraw-Hill Dept. of Economics
Income in 1950 excludes G-I insurance dividend

Mid-Year Outlook Points to Stability

With inventories in balance and incomes continuing at peak, consumer demand for foods will keep production going strong despite decline in exports

ROBERT P. ULIN
McGraw-Hill Department of Economics

The food industries are entering their heavy production season with more assurance about what lies ahead in sales and profits than at any time in the past few years.

In 1950 we have neither an unstable boom in food products, like that of 1947-48, nor a succession of sharp declines in prices and inventories, as in 1949. At both the consumer and the distributor level, overall demand for foods can only be characterized as steady.

Recovery From 1949 Slump

It is now clear that the food business made its postwar readjustment to lower levels of prices and production during 1949. This revision was made necessary by the ending of the immediate postwar needs for rebuilding distributors' stocks and for exports to devastated foreign countries. The resultant lower requirements, coupled with increasing food supplies, brought on cuts in prices and in processing activity during the second half of 1949.

One of the important downward influences on processors' activity was the tendency of distributors to reduce inventories—in some cases below levels warranted by sales to consumers—in anticipation of price cuts. During the summer and early fall of 1949, inventories throughout the food trade were the lowest in relation to sales for several years. The reduction was accomplished by ordering less from processors. Inventories at the processing plants were also allowed to run down.

By early 1950, however, the situation had clearly stabilized. Food supplies continued to increase, but at a slower rate. And the price decline slowed down to a drift, with wholesale food prices in the first quarter averaging only 3 percent below the first quarter of 1949.

Inventories began to be built up again. Processors' output and sales regained the levels they had reached early in 1949, before the inventory recession. And this despite the fact that export sales were continuing to decline.

In the last few months, wholesale food prices have been strengthening instead of sliding as they did last year. FOOD INDUSTRIES' index of production (see p. 8) has ranged between 135 and 140, slightly below the corresponding months of 1949, but well above the recession low point of 132. Processors and distributors have evidently continued to add to their inventories. The question now is whether this new strength can be maintained.

Retail Sales the Key

The best indication that processing output can hold at this level is the strength of retail sales. Consumer expenditures on food have remained high and steady for the past three years. There was no let-up in the housewife's buying, even during the so-called recession of 1949. And in the first quarter of 1950, sales of retail food stores and restaurants combined were holding at the '49 level in dollars, and were up slightly in units.

The share of consumer income spent on food is considerably higher today

than before the war. And the experience of four successive postwar years indicates that the new level of spending is going to be maintained. As food prices decline, people tend to shift to the better quality foods and maintain their food budgets—when, of course, family income remains high.

This means that, if consumer incomes continue near present levels, retail food sales will continue strong in the second half of 1950. And the current outlook is for continued high incomes. General business activity is booming and promises to continue doing so for at least several months to come. The important automobile, construction and capital goods industries are all enjoying near-record prosperity. High employment in these industries, which account for a big share of all industrial workers, virtually assures plenty of purchasing power for food products.

Firm Prices and Inventories

On a seasonally adjusted basis, total retail food sales may be expected to hold steady for the remainder of this year. And this stability should be reflected in distributors' orders and processing activity. Some further increase in food supplies will occur with the new crop season. Farm output of livestock and dairy products is still increasing. And grains will probably be plentiful. But the main price adjustment in farm and food products was completed in 1949. After the peak marketing season, prices are not likely to level out much below the range prevailing at the beginning of 1950.

The combination of continued strength in retail sales and leveling out in prices should limit any tendency to reduce inventories, in contrast to the large scale liquidation that took place last year. So variations in output of processed foods should be much less. Seasonally adjusted, production and sales in the second half of this year promise to come close to first half figures for most of the industry, although some segments might be hampered by short crops or by lagging export demand.

Export Markets

Exports of processed foods thus far in 1950 have been at a rate well below that achieved in 1949. The foreign market for cheese has practically been eliminated by the end of British purchases, Also, increasing milk flow throughout Europe has greatly reduced the demand for shipments of condensed and evaporated milk or dry milk solids from this country. The main result of less foreign demand for dairy products will be larger U. S. Government holdings, since surplus domestic output is absorbed by the price support purchase program.

Likely, lard will still be sold in large quantities to Cuba and Western Germany, countries with a good supply of dollars and no lard production of their own. Shortening and tallow exports are slated to dip somewhat, yet the foreign markets are seen remaining fairly strong. The export drop may have some adverse effect on shortening production. But since lard and tallow are by-products of meat packing, their output is largely independent of export demand. The result here will probably be lower prices.

Flour is still the most important food export. But markets are dwindling fast. It seems unlikely that more than 10,000,000 bags will be sent overseas in the next year, compared with about 18,000,000 in the year ended June 30, 1950. Good wheat harvests are expected abroad. Foreign milling capacity has also been built up. Since many U. S. mills are directly dependent on this trade, lower output must be looked for. The indicated decline in flour and dairy shipments is enough to drag down the total of processed food exports, in spite of fairly good demand for lard and some minor products.

Profit Outlook

Fewer inventory fluctuations will mean more stable profits for many food companies that suffered inventory losses during 1949. The spread between operating costs and prices is also likely to be better maintained. Last year, reductions in farm prices were more than offset by lower wholesale food prices, higher wages, freight, and other costs. The current outlook is for smaller increases in wage costs and relative stability in freight charges and in prices of farm products and most packaging materials. So the industry's average profit margin may recover to 3 percent of sales, after dipping somewhat lower last year. One of the most important factors in improving profit margins is the continuing installation of new labor-saving equipment, on which the industry spent $600,000,000 in 1949 and $305,000,000 in the first half of 1950. Further additions, totaling $320,000,000, are planned for the second half-year.

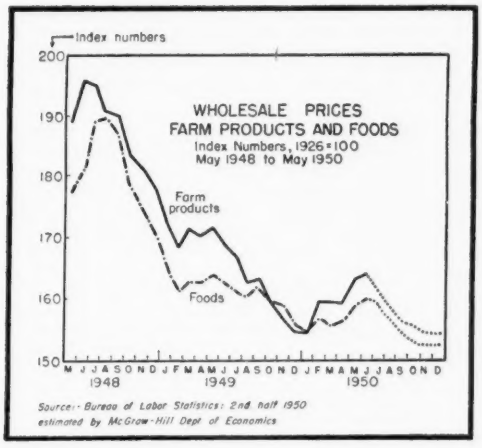
New Crops

Here is the outlook for production of various foods in the coming season, based on the latest estimates of the Department of Agriculture:

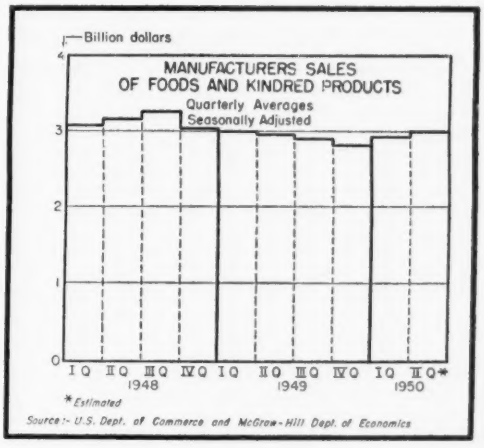
Fruits and vegetables: Acreage for processing is expected to be only

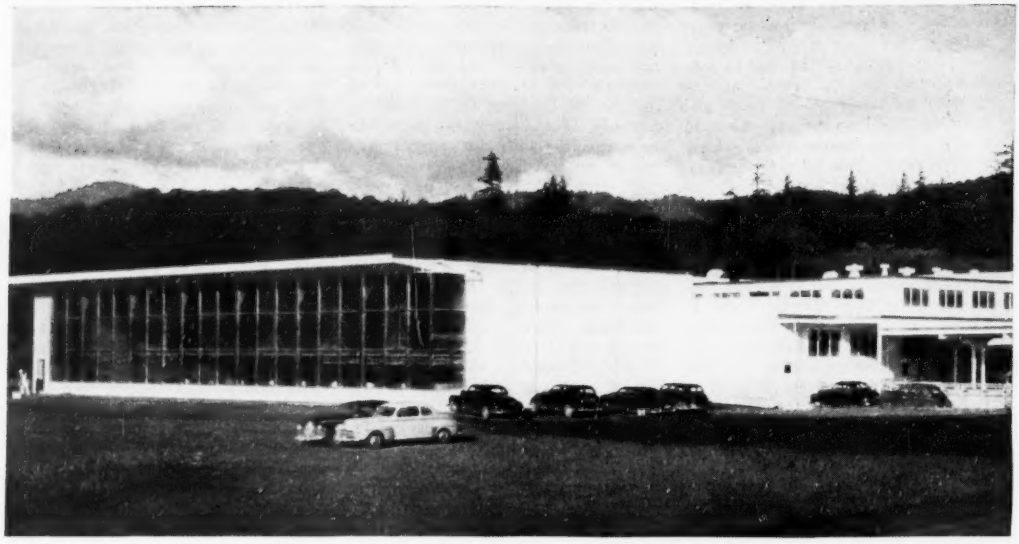
(*Turn to page* 167)

Price Slide Halts . . .


Index numbers
200
190
180
170
160
150
WHOLESALE PRICES
FARM PRODUCTS AND FOODS
Index Numbers, 1926=100
May 1948 to May 1950
Farm products
Foods
M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1948
1949
1950
Source:- Bureau of Labor Statistics; 2nd half 1950 estimated by McGraw-Hill Dept of Economics

. . . While Sales Hold Level





NEW $1,500,000 Tillamook plant is monument to cooperative achievement. Cheese production (600,000 lb. milk daily)

Varied Output Is Cheese

By skillful planning for most efficient utilization of milk

J. SPENCER GEORGE
Technologist, Tillamook County Creamery Assn., Tillamook, Ore.

Careful planning—therein lies that "extra something" which is assuring the most profitable utilization of milk at the new $1,500,000 cheese factory of the Tillamook County Creamery Assn.

And the key to this high-performance planning is diversification. For the plant at Tillamook, Ore., is not exclusively a cheese factory. Of its total receipts running to 720,000 lb. of milk daily, a good round 120,000 lb. is distributed as fluid milk and cream, ice cream, butter, cottage cheese, and buttermilk.

As an example of the thorough utilization, the Grade A milk, over and above that bottled, is separated into cream or used directly in the manufacture of chocolate milk or ice cream mix. Cream may be bottled, used in ice cream, or made into butter. Skim milk goes into cottage cheese and cultured buttermilk.

In the cheese department, whey, which represents a large part of the milk used and frequently poses a disposal problem, is separated for recovery of its fat content, then concentrated for final drying into poultry feed.

Let us now "take aim" with this article. Planning is our subject. But the truth is that the mapping of principles can get a bit abstract. Frankly, we think the proof is in the performance—in short, skillful planning is best described by observation of what the successful company is actually doing out on the line:

How Milk Is Received

The new plant has two receiving islands extending 100 ft. into the yard (photo above). Each island has two can conveyors, one running into and one out of the plant. The 10-gal. cans of fresh milk are unloaded from producers' trucks onto a receiving conveyor and move to the milk dumping stations inside the plant. When empty, the cans are washed and returned by an outgoing conveyor to be re-loaded onto trucks.

At each dumping station, the milk is first inspected for flavor and odor, and if acceptable, cans are emptied into the weigh-tank. Then a representative sample is taken for butterfat analysis to determine payment to the dairyman. Resazurin reductase tests are made every two weeks and sediment tests once a month.

Milk for cheese manufacture is received through two of the dumping stations. It is then pumped to surge or holding tanks where it is standardized to a fat content that will yield the desired 52 to 53 percent butterfat in the dry matter of the finished cheese. Cream, separated from this milk and not used for standardization purposes, is pumped to the butter-making department.

Throughout the plant, tanks and vats are of stainless steel, and piping and pumps are either of this steel or white metal.

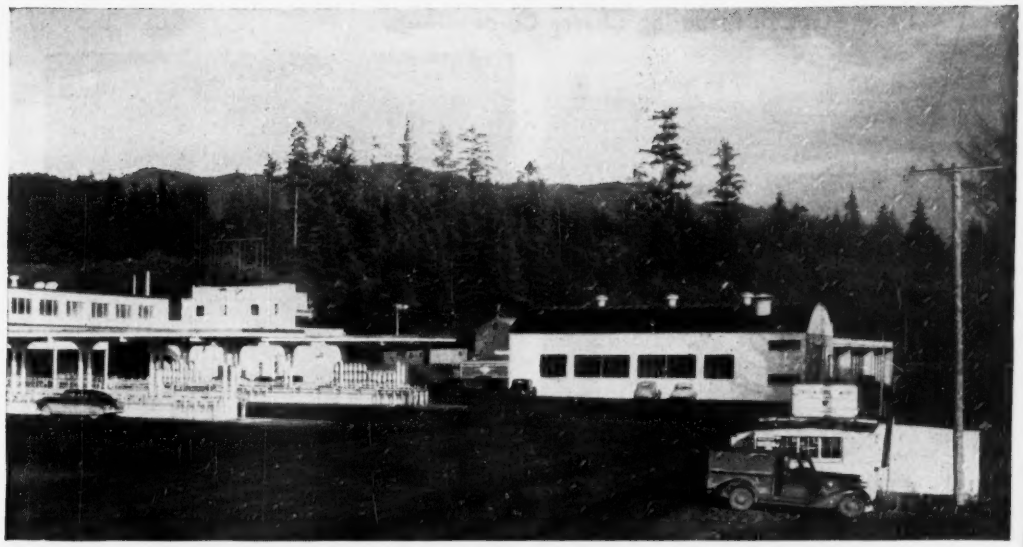
Cheddar Cheese Process

Standardized milk for cheese manufacture is pumped from the holding tanks to 20,000 lb. cheese vats. Each vat is jacketed and designed to be heated with hot water. At the present time, however, steam is used for heating.

Vats are equipped with two mechanical agitators, which move back and forth on an overhead track from the center to the ends. They have two speeds, one 6 rpm. and one 12 rpm., and there are several kinds of paddles, changed for various stages of the process.

The milk is heated slowly, with constant mechanical agitation, until it reaches 86 deg. F. This is the optimum temperature for rennet coagulation. It is also favorable for organisms contained in the starter, which is then added and thoroughly mixed.

After about one hour's incubation,



sets pace of operation. But output of milk, cream, and butter (120,000 lb. milk) provides the needed "economic balance."

Plant's Tonic for Profits

new factory has assured maximum return per pound

the milk is usually ripe enough to set (ripening time will vary according to the activity of the culture used). At the end of this step, acidity of the milk must be about 0.02 percent more than it was originally.

The milk is then thoroughly mixed, and during mixing 1¼ oz. of light orange vegetable coloring is added to give the cheese its characteristic hue. Also put in are 4 oz. of rennet to facilitate rapid coagulation of the batch. Speed of agitation is now increased to 12 rpm. to disperse the rennet and color throughout the milk, and this augmented stirring is continued for about 4 min., after which the agitators are removed.

Coagulation of the renneted milk begins within a few minutes, and soon the entire batch becomes a solid jelly-like mass. In about 25 min., the curd is ready for cutting—when the cheesemaker finds that it will break cleanly when held over one finger. Then, two operators one with a knife having horizontal wires, the other with one having vertical wires, make lengthwise passes through the coagulated milk, from one end of the vat to the other. This produces curds, ¼- to ⅜-in. in size, which immediately begin to exude whey, and decrease in volume.

Curds that cling to the sides of the vat are wiped free. The agitators, now equipped with paddles, are started at a speed of 6 rpm. and heat is applied. Cooking reduces moisture in the curd by accelerating whey expulsion. It also hastens acidity development by accelerating bacterial growth.

During the 50-min. cooking process, curds are gradually warmed to 100 to 102 deg. F. Steam is then turned off and the curds become firm under continued, gentle stirring at an agitator speed of 12 rpm. In about two hours they reach the proper consistency or body. Here, required acidity is .15 percent. Curds are then pushed to the rear of the vat and made into a pile, from which, by the gentle pressure of their own weight, whey is exuded. The drain at the front of the vat is opened, and the flow of free whey is pumped to a storage tank.

Curds are then arranged in two banks, about 14 in. high and 30 in. wide, along each side of the vat—a channel being left in the center for whey drainage. Moisture drains rapidly from the curd, and acidity increases progressively to about .22 percent.

Two horizontal cuts are now made down the center of each bank of curds from one end of the vat to the other. Then transverse cuts are made in that part of each bank nearest the center channel, so that this portion of the bank is now composed of blocks measuring about 15 in. square by 14 in. deep. The blocks are now lifted and placed on top of the uncut banks against the walls of the vat. This is called "cheddaring." This first cutting and piling is followed by as many as three repetitions, at 15 min. intervals.

Milling the Curds

Cheddaring ends when the moisture content of the curds reaches approximately 44 percent. On completion, curds have formed into a homogeneous layer, about 8 in. deep and 36 in. wide, on the bottom of the vat.

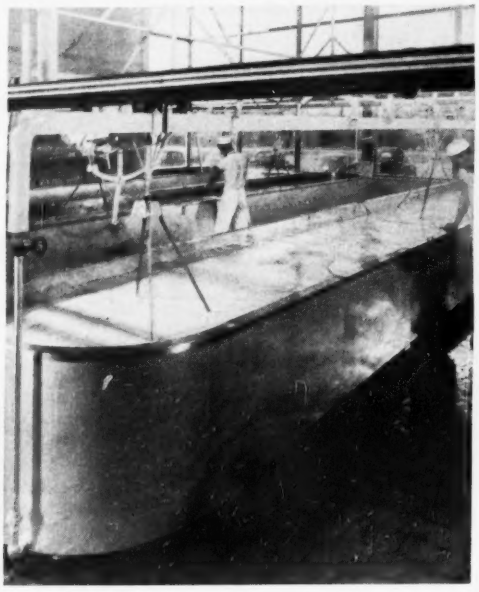
The curds have now attained the proper body for milling. In this operation, the layer is first cut into slices about 1-in. thick and then these slices are fed through the curd mill, which chops them into pieces about ⅝ in. by 2 in. The mill is set up on a base that rests on the sides of the vat and is moved along it as the cutting of the layer proceeds.

To keep the cut curds from re-matting, they are turned by hand forks, and later by forks attached to the 12-

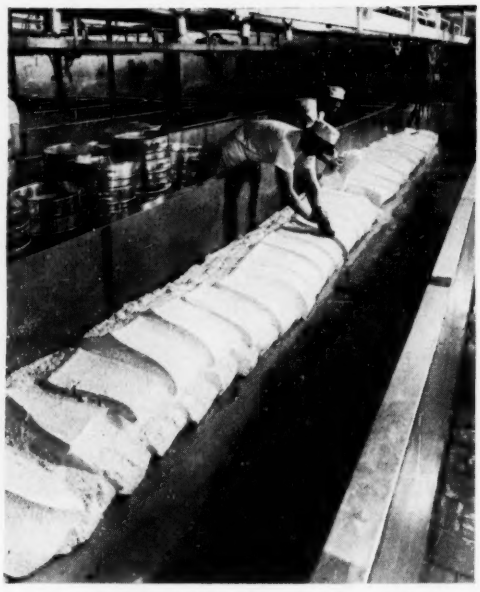
Big Foldout Flowsheet—

of Tillamook's modern Cheddar cheese process and allied operations—with sharp-detail diagrams flanked by close-up photos—will be found on pages 102-105.

These Are Key Steps In Preparing Cheese Curds →



1 **HEATING** milk is start of process. Stirring is continuous by the two overhead-mounted agitators.



2 **CHEDDARING.** Curd is cut into blocks, then blocks on right side of vat are placed on top of those on left.

rpm. agitators. Turning continues for about 20 min.—until butterfat glosses over the surface of the curds, reducing the chance of matting, and until the formation satisfies the cheesemaker's "touch test." Salt is then sprinkled over the batch, at the rate of 3 to 3½ lb. to 100 lb. of curd. Mechanical agitation is continued until the salt penetrates the curds.

Cheese Hooping

Curds are next filled into hoops by two teams of 4 men each, working on each side of a vat. "Dressing" of hoops includes placing a circle press cloth in the bottom and then a starched cheesecloth circle. The cheesecloth bandage, which covers the outside of the cheese, is fitted around the bandager (a tinned metal band that fits inside the top of the hoop). This holds the top of the bandage firmly in place while the lower part is carefully tucked around the hoop.

On completing the initial pressing, the bandager is removed and the bandage gathered around the top by pulling a few threads near the edge. The bandager is then replaced, this time on the outside of the cloth. A starched cheesecloth circle is placed on top of the cheese, a circle press cloth on top of this, and then the metal follower. It is now ready for overnight pressing.

In the morning, the cheese is removed from the hoops and a representative sample taken to the laboratory. Here, it is checked for composition and uniformity of moisture content.

The cheese is then hand-trucked to the dry room, where it is stored on shelves for 3 days at 50 deg. F. Following this storage, it is dipped, first in pure paraffin at 240 deg. F., then in a mixture of ⅔ paraffin and ⅓ flexible wax held at 210 deg. F. It now goes to the drying room, where it is held for 3 to 6 weeks at 50 deg. F. Then it is returned to the dipping room and coated with a mixture of paraffin and microcrystalline waxes, following which it is transferred to the 36-deg.-F. storage room for aging, or until shipped.

Rindless Cheese

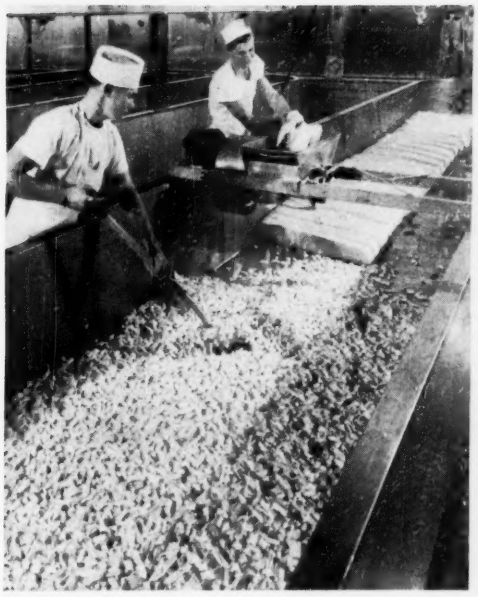
Some of the curd is placed in Wilson-type, 20-lb. 14 x 11 x 3½-in. stainless steel hoops, equipped with lids. There is a sleeve that telescopes into the hoops. No bandage is used, but after 30 min. pressing, the cheese is taken out of the hoop, wrapped in a press cloth, returned to the hoops and pressed overnight. In the morning, the cheese is removed from the hoop, press cloths are discarded, and the cheese is wrapped in 40-gage Pliofilm and then over-wrapped in glassine and placed in wooden boxes to confine it to exact size. Filled boxes are placed on pallets, and a fork truck moves them to the 80-deg. warm room, where they are held for 36 hr., then moved to the 36-deg. storage room and aged for 3 to 5 months.

When properly aged, the cheese is returned to the warm room and its temperature brought to 80 deg. F. to facilitate cutting for packaging. The 20-lb. blocks are manually cut (with a butter-type cutter) into 1- or ½-lb. pieces. Slices are check-weighed and hand-wrapped in 40-gage Pliofilm, then machine-wrapped in cellophane and heat sealed. A solvent, softened by integral heaters, is employed in the film sealing operation. Wrapped cheese is then cased and returned to the 80 deg. room for 12 to 36 hr. This produces, on the surface of the cheese, a coating of butterfat that adheres to the Pliofilm, excluding air, the usual cause of mold growth.

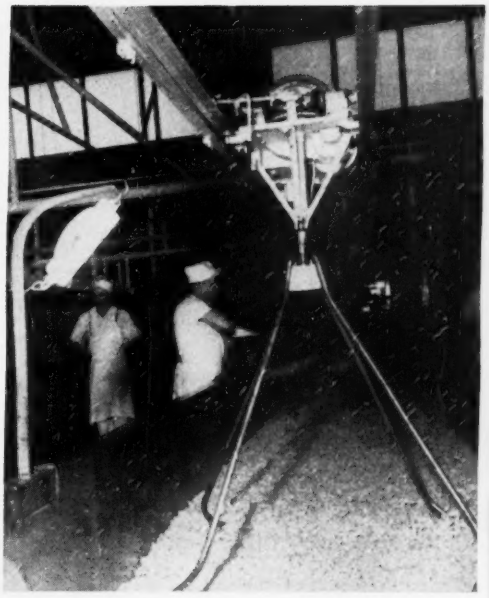
Club Cheese Manufacture

Cheese trimmed from overweight, and underweight, or misshaped rindless squares, is blended with selected "triplet" cheese, of the proper age to make club cheese. It is ground in a meat grinder. Then it is blended with liquid, and other ingredients such as dehydrated garlic and smoked materials, in a 60-qt. Hobart mixer. When the mass is homogeneous, 85 lb. of it is placed in an air-actuated stuffer that feeds it through a semi-automatic filler.

The filler is a metering device that delivers the correct weight after an initial adjustment is made. An operator



3 **CUTTING.** When cheddaring is complete, blocks of curd are sliced and milled into small pieces.



SALTING. Over the batch is sprinkled salt as the curd are sliced and milled into small pieces.

slips the printed Pliofilm sleeve container over the stuffing tube with her right hand and pulls the feed lever with her left. This causes one chamber of the filler to empty into the sleeve while the other is simultaneously filled from the supply chamber.

The link of cheese is now passed to another operator, who twists the open end and removes any cheese that may adhere to the opening. The third and fourth operators tie the ends with string and place the links in cartons for storage or sale.

Whey Recovery

Whey from the cheese vats and presses is pumped back to the now-empty 33,000-gal. surge tank for temporary storage. From here it is fed to a battery of cream separators for removal of fat. The butterfat flows into 10 gal. cans to be sold to another manufacturer for the making of butter.

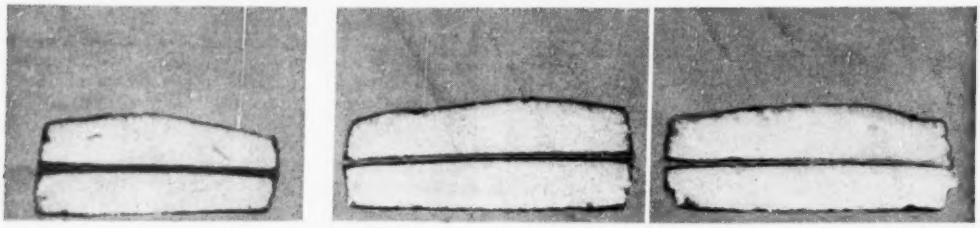
The separated whey is pumped to a plant of Western Condensing Co., located adjacent to the cheese plant on Tillamook property. Here, it is concentrated to 45 percent solids in a 4-effect vacuum system. It is then pumped to storage tanks to await delivery to Portland by tank trucks for further concentrated by spray drying.

The Association constructed its own 4,000,000-gal. reservoir 3 mi. above the new plant. Water drops 220 ft. in a 12-in. pipe line and is delivered at a pressure of 89 psi. In addition to this reservoir, a standby well was driven near the plant.

A sewage disposal system, large enough for a city of 15,000, was also built. These facilities afford a wide margin of safety above maximum anticipated usage.

CHEESE PRODUCTS include the 24-lb. triplet; the 5-lb. loaf; the 1-lb., ½-lb., and 2-lb. rindless packages; 3-lb. Gem; 2-lb. Baby Loaf, and club cheese.

Old—Coarse Grained **New—Fine Grained, More Tender**



TEXTURE DIFFERENCE of cakes mixed by old and new methods shows up in cross-section examination of cell structure. Control formula (old) cake is coarse grained, with deficient aeration. Second and third cakes, mixed according to new sugar-water formulas No. 1 and 2, respectively, are finer grained and more tender. Second cake used only 75 percent as much leavening as first. Third cake is slightly less fine because a little more leavening and water were used.

New Mixing Method Improves Cake Quality

American Institute of Baking "pre-mixes" granulated sucrose and water. Cakes are bigger, have better emulsion, also very high aeration

E. S. STATELER
Associate Editor, "Food Industries"

Experimental studies at the American Institute of Baking, Chicago, have resulted in a new and simplified method of mixing batters that gives cakes maximum volume, improved emulsion, and an unusual degree of aeration. Further, less leavening is required.

All of the foregoing is accomplished without any change in the established ingredient formula for the particular cake, except for the decrease in the amount of leavening agent employed in the cakes.

Also, no additional equipment and no changes in the existing machinery are needed. The method is regarded by the Institute as a valuable progressive step in cake-making technology; superior to the present generally accepted methods.

Change in method of introducing sugar into the mixes is the crux of the procedure, it was revealed by George S. Carrie, instructor in making of cakes and sweet goods at the American Institute School of Baking. He had been seeking ways and means of using granulated sucrose in cake mixes to obtain the desirable characteristics that the use of liquid sucrose gives.

The new procedure has been used successfully in the making of layer, pound, and sponge cake mixes and is being taught to baking students at the Institute.

New Method Outlined

Details of the methods are as follows:

1. All sugar specified by the formula being used is weighed into the mixing bowl together with water amounting to approximately one-half the weight of the sugar. There is then mixing or stirring sufficiently to get most of the sugar into solution.
2. Remainder of dry ingredients are added, and the mass is mixed at medium speed until mix is homogeneous and full aeration is attained, as indicated by lightness of the batter.
3. Eggs are added and blended in to

How Test Batters Were Mixed

TABLE I—CONTROL FORMULA (Conventional Method)

Ingredients	Formula Percent†	Weight Lb.-Oz.
Start with:		
Flour	100.0	3-2
Granulated sucrose	120.0	3-12
Emulsified shortening	46.0	1-7
Non-fat milk solids	9.0	0-4½
Baking powder	6.0	0-3
Salt	3.5	0-1¾
Water	64.0	2-0
And mix 3 min. at 1st speed. Then gradually add:		
Water	31.0	0-15½
Whole eggs	46.0	1-7
Vanilla	0.5	0-¼

And mix 3 min. at 1st speed.
† Percent by weight based on flour = 100 percent

TABLE II—SUGAR-WATER FORMULAS (New Mixing Method)

(Formula No. 1 is given below. Formula No. 2 is same, except for quantities marked*)

Ingredients	Formula Percent†	Weight Lb.-Oz.
Start with:		
Granulated sucrose	120.0	3-12
Water	64.0	2-0
And mix 30 sec. at 2nd speed. Then add:		
Emulsified shortening	46.0	1-7
Flour	100.0	3-2
Non-fat milk solids	9.0	0-4½
Baking powder	4.5*	0-2¼*
Salt	3.5	0-1¾
And mix 5 min. at 2nd speed. Then add:		
Water	31.0*	0-15½*
Whole eggs	46.0	1-7
Vanilla	0.5	0-¼

And mix 1 min. at 1st speed.
† Percent by weight based on flour = 100 percent
* In Sugar-Water Formula No. 2, baking powder is 6.0 percent, 3 oz.; and water is 46 percent, 1 lb. 7 oz.

smooth out and give desired property to the mix.

During the experimental development, the formulas shown here in Tables I and II were used. Mixer was a 20-qt. Hobart bench model that ran at three speeds (referred to as 1st, 2nd and 3rd in tables). For larger machines and commercial-size batches, mixing times and speeds must be adjusted accordingly.

What They Did

The control formula (Table I) is that of a typical yellow layer cake containing 120 percent of sugar (based on the weight of flour used) and compounded in the following generally used manner: (1) Flour, granulated sucrose, high-ratio shortening, nonfat milk solids, baking powder, salt, and approximately two-thirds of the water were mixed at the customary 1st speed for 3 min.; (2) remaining water, eggs and flavoring were added gradually; (3) mixing was completed using 1st speed for another 3 min. The bowl was scraped down periodically as needed.

In the experimental sugar-water formula No. 1 (Table II), sugar and about one-half its weight of water were placed in the mixer and stirred 30 sec. to dissolve most of the sugar. Then the high-ratio shortening, flour, nonfat milk solids, salt and baking powder were added and mixed in 2nd speed for 5 min. The baking powder was reduced to 75 percent of amount used in the control formula. Finally, the remaining water, whole eggs and flavoring were added, and mixing was continued to make a smooth batter.

As a check on the role played by the baking powder and water, a third bake of cakes was made, using sugar-water formula No. 2 (Table II), according to following procedure: (1) The sugar and about one-half its weight of water were weighed into the mixer and stirred for 30 sec. to dissolve the sugar; (2) high-ratio shortening, flour, nonfat milk solids, baking powder, and salt were added and mixed in 2nd speed for 5 min. Amount of baking powder used was the same as in the control formula; (3) remaining water, eggs, and flavoring were added, and the mixing was completed in 1st speed for 1 min. In this case, the amount of water used was increased 15 percent over that used in the control formula.

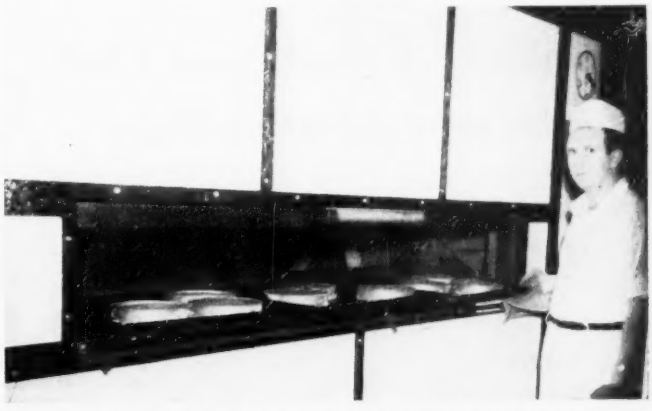
In both instances where the sugar-water formulas are employed, better emulsification is obtained, more aeration results from the mixing, and less scraping down of the mixing bowl is required than when the control formula is used. Because the sugar-water method of mixing does result in greater aeration, the amount of leav-

(*Turn to page* 166)

Operation Cake-Bake—New Style

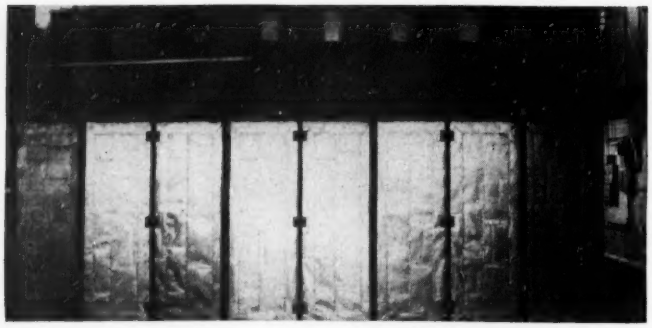
Weighed Ingredients for new cake mixing method are weighed in customary manner, starting with sucrose and water.

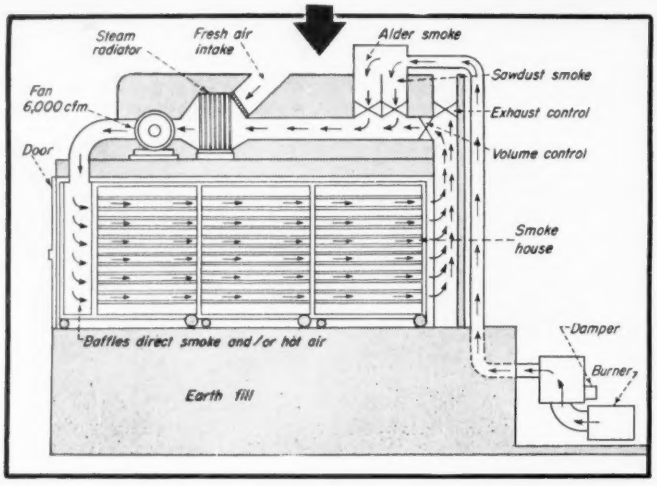
Mixed Pre-mix for 30 sec. dissolves sugar in the water, then further mixing blends rest of ingredients to smooth batter.



Baked New and old methods bake at same temperature and time. Cakes cool slightly, then are emptied from pans.

How It Looks Outside, How It Works Inside





SIMPLICITY is feature. Top: Exterior view shows double doors through which trucks of fish are loaded into smokehouse and later removed. Over doors are seen insulated compartments which house radiators and fans. Above: Drawing of interior shows how smoke is cooled. It passes through earth-fill before reaching smokehouse. At top is seen arrangement for mixing smoke and air.

Smaller Smokehouse Unit Yet Kippers More Fish

New facility uses forced air-smoke, controlled temperature and humidity, and trays on mobile trucks. Result: More uniform smoking in one-eighth the time

RAY BLOOMBERG
Northwest Correspondent, "Food Industries"

Smoking and kippering 65 percent bigger lots of salmon in 1/8th the time and 1/27th the space! This is the achievement of San Juan Fishing & Packing Co., Seattle, Wash., following replacement of its old smokehouse with a new $17,000 unit.

The new smokehouse, measuring 14 x 20 ft., occupies less than one story, whereas the former one was 75 x 25 ft. and took four stories. The new facility's four separately controlled units, which can be used for kippering or mild or hard smoking, have a total capacity of 10,000 lb. The old structure could kipper only 6,000 lb., although it had more space for mild and hard smoking.

Fish are kippered in 6 hr. and hard smoked in 7 days in the new smokehouse, as compared to 2 days and 20 days, respectively, in the old structure. The reduction in time is made possible by use of forced air.

In the earlier smokehouse, air-smoke circulation was maintained by natural draft, and temperature and humidity could be regulated to only a limited extent. But with the improved setup, there is close control over the following four variables: Circulation, smoke volume and density, humidity, and temperature. This has brought easier operation and a much more uniform product.

How Fish Are Prepared

When fish, either cod or salmon, are prepared for kippering, they are first filleted, then cut into chunks about 6 in. long and weighing about 1 lb. each. These chunks are dropped into a steel basket of 200-lb. capacity and conveyed on an overhead rail to a brining tank, where they are soaked for 2¼ hr. The basket is then lifted out and deposited in another tank containing a solution of kipper-color vegetable dye. After 4 or 5 min., the basket is removed from the coloring tank, and the chunks of fish are placed on trays in mobile racks.

Of the refrigerator type, the trays are made of 12-gage galvanized steel wire and measure 19 x 40 in. They are spaced about 6 in. apart on the mobile rack. Since the chunks of fish are about 3½ in. thick, this allows an air circulation space of about 2½ in. between the top of the fish and the bottom of the tray above.

Each smokehouse unit holds three of these mobile racks. The end of the rack nearest the door has built-in baffles that direct the air across each tray.

Atop each unit is a standard cast steam radiator with 500 ft. of radiation and a squirrel fan which has a capacity of 6,000 cfm. The fan draws fresh air through the radiator and blows it down into the smokehouse. After air circulates through the unit, it is either exhausted or drawn through the fan and recirculated. Dampers permit partial or total exhaustion or recirculation.

When fish is being kippered, the temperature is brought up to the 110-

120 deg. F. range and held for 1½ hr., during which time a "pellicle," or glossy film, forms on the fish. This film gives the desired appearance to the fish and allows absorption of the delicate smoke flavor. Its formation is important in securing a good quality smoked product. Without it, the fish would spoil, since their moisture content is high enough to support the growth of microorganisms.

After the pellicle film forms, cold smoke is introduced into the air stream. This may be either sawdust smoke (which is heavier and improves the kipper color) or alder smoke (which is lighter and dryer and therefore cures faster). When desired, a combination of the two may be used.

The temperature is gradually increased to 180 deg. F. (over a 60-min. period) and held there for 2½ hr., after which 1 hr. is allowed for cooling.

Hard and Mild Smoking

In preparing a salmon for Indian hard smoking, the fillets are first soaked in brine for two to three months. This is accomplished by packing alternate layers of salt and fish in 825-lb. barrels, or "tierces," and placing them in cold storage. In this type cure, the salt concentration of the fish reaches 8 to 10 percent. After brining, the fillets are soaked in cold running water for a few hours, then placed on hangers in the smokehouse racks. Each rack holds about 1,200 lb. of fish in three tiers.

In hard smoking, no heat is used. The fan simply circulates smoke and fresh air for seven days. On the other hand, mild smoking requires only three days. And salt herring is smoked four days to make "bloaters."

In the new smokehouse, the operator's job is less burdensome than it was under the former method. As stated, the old smokehouse units were high, and accordingly the fish were hung at various levels and at varying distances from the smoke's source. Therefore, some fish were cured before others. And so, during the last week of the hard smoking process, the operator had to go into the smokehouse, take out the fish that were cured, and move the others to where they would get more smoke.

Today, however, all fish are hard-cured in the same length of time. The only judgment required of an operator is to know when the curing is completed.

At first, the company used two separate burners in the basement to provide smoke for the new smokehouse—one for fine "box" sawdust and one for alder logs. However, the sawdust is so fine that it would not feed to the burner properly, hence this arrangement was abandoned. Now, when sawdust smoke is desired, a few shovelfuls of sawdust are placed over the smouldering alder logs. When alder smoke is desired (as is usually the case), the alder logs are burned alone.

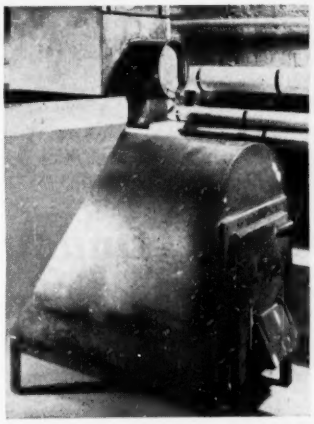
Because it gave thick smoke, sawdust was used more under former methods, but with the new forced circulation, such thick smoke is unnecessary and alder smoke usually gets the nod.

When needed, smoke is drawn through spun-glass filters (changed every 24 hr.) and up the pipes to the top of the smokehouse. Cooling of smoke is accomplished by the length of the pipe, a section of which passes through an earth-fill outside the furnace room.

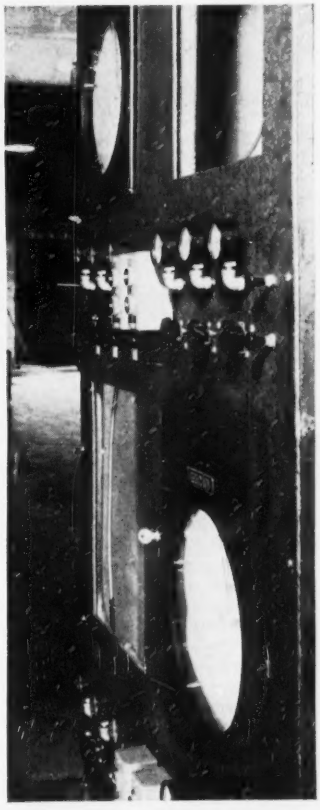
Early in the operation, creosote accumulation in the pipes posed a problem. Since then, however, the pipe leaving the smoke generator has been changed to form a U, with small holes

(*Turn to page* 166)

Auxiliaries Speed the Smoking Job

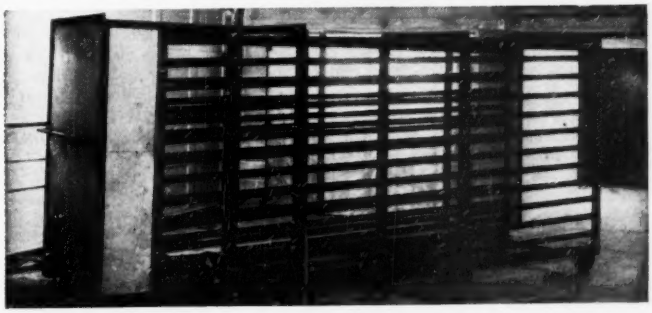


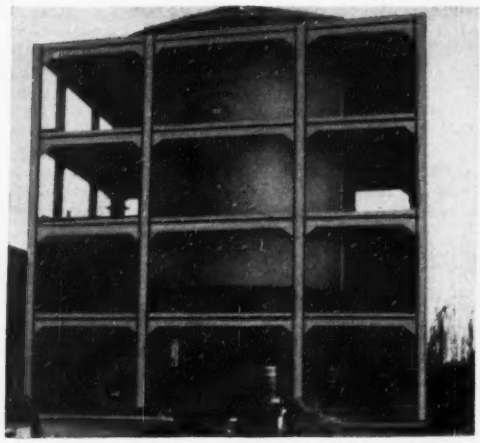
PRIMARY BURNER (above ↑) uses alder logs to make smoke. When heavier smoke is required, sawdust is shoveled onto logs. Hopper (left) which was installed to feed sawdust to special burner, is now unused.



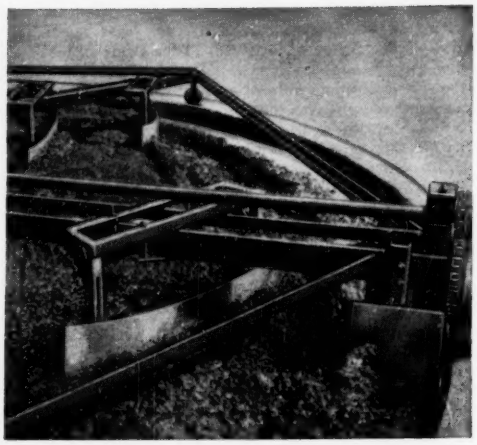
PANEL (right→) from which smoke volume, air intake and exhaust, and fan operation are controlled. It also has recorders for wet- and dry-bulb temperatures and pressure indicating gages.

THREE TRUCKS IN TANDEM (below ↓) comprise one smoking unit. Galvanized compartment (left end of truck) has built-in baffles that direct smoke into spaces between trays.





NEW PROCESS features this 30-ft. cylindrical, concrete reinforced tower that holds 100,000 gal. of wine.



PLOWS on fermenting tower automatically remove spent grape skins. They are then chuted to continuous press.

Wine Now Made *Continuously*

—by Argentina-developed fermenter that mechanically removes skins and seeds. Product termed better. Labor, space saved

MARCELO WILLIG
Engineer, Buenos Aires, Argentina

With the recent installation of a new, specially designed fermenting tower that makes wines continuously for the first time, it has been reported that an improved product is being turned out with less labor and in smaller space.

Outstanding feature is the procedure of introducing crushed grapes and withdrawing wine while fermentation continues — simultaneous with automatic removal of seeds and skins.

Credited with the development is Victor M. Cremaschi, who set up the first fermenting tower at Faraon Wine Storage in General Alvear, Mendoza Province, Argentina.

Principle difference between the new and conventional batch processes is the method of removing seeds and skins from the fermenting tank. In the new way, grape seeds and skins are taken out mechanically during fermentation, while in the batch method they are shoveled from the tanks after fermentation has been completed.

The Cremaschi process owes its success to the method by which carbon dioxide gas buoys the skins so that a circular plowing mechanism at the top of the fermenting tower can continuously remove them after red coloring matter is extracted. Accumulated seeds are intermittently discharged from the bottom of the tower.

Disadvantage of the batch method is the tedious labor of shoveling out the skins and seeds when fermentation has stopped. And this emptying of the tanks is no pleasant job, since the workers are exposed to dangerous carbon dioxide fumes, as well as heat and alcohol vapors. During the initial stages of fermentation by the batch process, grape skins float in the heavy density juice. Later, when fermentation has been completed, the skins settle in the lower-density wine.

Special Fermenter Designed

Continuous fermentation is carried out in a cylindrical tower with a conical bottom (see diagram). Made of reinforced concrete, the tower is 30 ft. high and 24 ft. in dia. and it has a capacity of 100,000 gal. At the top of the unit are the circular plows for removing skins.

There are six gate valves. One directly above the cone is for introducing crushed grapes into the tower. Another at the bottom of the cone is for discharging seeds. The remaining four valves are at different levels of the tank for piping off wine.

Four thermometers are located at different levels of the fermenting tank.

After the tank has been filled with crushed grapes—at the end of the 3rd to 5th day—several layers of skins form on the top. The uppermost layer is completely exhausted (all the red color has been extracted) and it protrudes about 5 in. above the level of the wine.

Sugar content and density progressively diminishes the higher the liquid is in the tower. And by diverting some wine to incoming fresh juice, alcoholic content and temperature are regulated at will.

Once full, skins must be removed from the tank and wine piped off through the upper two gate valves before crushed grapes can be pumped into the unit. This process goes on until the vintage is completed.

Takes Less Space

Advantages of this method of fermentation are notable:

Less space is needed for equipment. For the new unit occupies only 460 sq. ft., whereas 30 vats by the batch method for the same output take 4,620 sq. ft.—ten times as much. That's the story of floor space. As for actual fermenting space, only about one-third the amount is needed.

Production runs during one week showed that 2,115,500 lb. of grapes were fermented in the 100,000-gal.

capacity tower. But for the batch process to ferment a comparable amount of grapes—2,108,100 lb.—a full 343,000 gal. capacity of vats was required.

Broken down on the basis of 1,000 lb. of grapes, the continuous process needed only 47 gal. of fermenting space, while the batch method required 163 gal. of space.

Works at Top Capacity

Operations are more efficient, since the fermenting tower works at maximum capacity. It is emptied only once—at the completion of the fermentation process. And crushed grapes admitted into the tower undergo optimum fermentation. There are not the repeated lags in fermentation activity encountered by the batch process, where considerable time is lost in getting fermentation underway following each new introduction of a batch of grapes.

Flexibility of the operation is sufficient to meet emergencies attributed to poor crops. For example, last year's frost and hail reduced the Argentine grape crop to 20 percent of the normal vintage. Only 2,000,000 lb. were available for the new-process winery over a period of 30 days. This meant that it was only possible to introduce small amounts of grapes each day into the fermenter and to start removing spent skins on the 20th day. Yet, by operating in this manner, there were no adverse effects—either in the wine or with the equipment.

High Temperatures Prevented

Heat of the fermenting grapes can be easily controlled to avoid undesirable effects attributed to high temperatures. Crushed grapes are added to a larger volume of warm fermenting juice. And, if the grapes are too cold, their temperature can be raised by mixing them with warm juice piped off from the upper section of the tower. Moreover, if the contents get too warm, the wine can be circulated through cooling coils. Control is also simply fixed because only one unit needs to be watched—instead of the former 30 vats.

Color of the red wine is improved, since the skins immediately rise to the upper zone in the tower, where extraction of the color is at the optimum due to the higher temperature and alcohol content of the wine.

Quality of the wine is more uniform due to the continuous nature of the process.

Only one pump is needed to deliver crushed grapes into the fermenting tower. And since this unit is 30 ft. high, wine can be gravity-fed to any location in the winery.

Since few seeds adhere to the skins, most of them can be drawn off from the bottom of the tank—and directly processed into a palatable salad oil.

Pressing of the skins is more efficient because of the fewer seeds, and the skins are heated in a jacketed chute on their way to a continuous hydraulic press. Capacity of the press is over 33,000 lb. an hour. And because this unit is fed by gravity, the labor is virtually eliminated. The removal of 40,000 lb. of skins requires but 7½ kw-hr. of power and only 75 min. of an attendant's time.

Cleaning has been simplified. For the continuous tower requires but two washings—once at the start of the season and then after it is finished. In the case of the batch process, the 30 vats must be washed every week—a total of 300 washings per season.

Less Sulphur Dioxide Needed

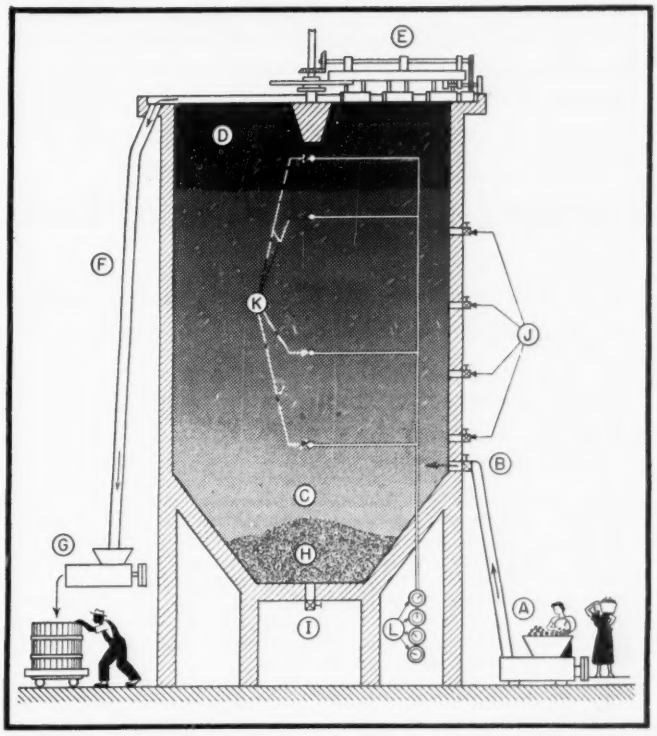
As for the undesirable microorganisms on skins, their growth is inhibited as the skins arise into the zone with the highest alcohol content. Thus, alcohol-tolerant yeast undergoes healthy uniform fermentation, and less SO_2 is required.

Production capacity has been increased. In the new-process winery, the former fermenting vats are now used for storage. This has enabled the winery to increase its production capacity with less than half the capital outlay that would have been necessary if the conventional batch process had been continued.

Initial trials made three years ago in a pilot plant had indicated commercial feasibility of the new system. And now with the experience of the Faraon Wine Storage the process appears readily adaptable in any-size winery.

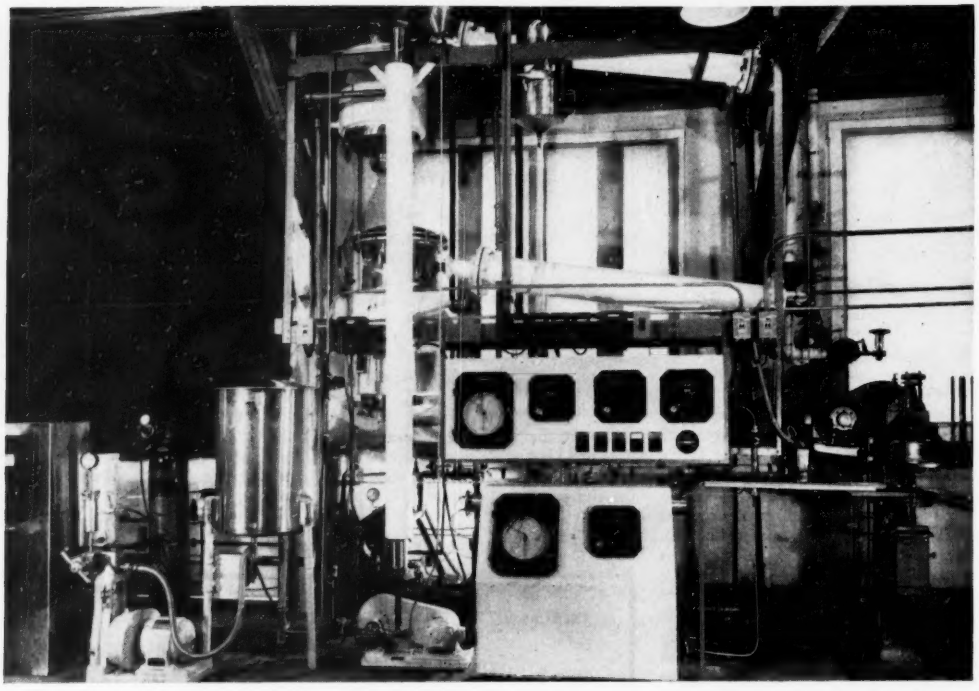
And, there is no need of stirring skins on top of the fermenting tower to extract the optimum amount of red color. Reason is that the skins are almost completely submerged in the wine due to their added weight—three to four times greater than the weight of the skins on top of conventional fermenting vats.

Tower Details and Process Steps



HOW SYSTEM WORKS: Crushed grapes (A) are pumped through pipe (B) into tower. As juice (C) ferments, CO_2 gas buoys skins (D) to top of tank, where plows (E) push them into chute (F) that feeds continuous hydraulic press (G). Seeds (H) are discharged through outlet (I). Wine is drawn off at outlets (J). Thermometers (K) are read on dials (L).

Commission's special combination juice unit, and



THIS PILOT PLANT, with capacity of ½ gpm., was used to study effect of pasteurizing, deaerating and deoiling.

Getting Quality-Plus in Tangerine Juice

Canning methods now carefully evaluated in exhaustive pilot studies, disclosing best practice for retention of flavor, color, and "C". Five factors accented

EDWIN L. MOORE, C. D. ADKINS, RICHARD L. HUGGART and L. G. MACDOWELL

Florida Citrus Commission, Lake Alfred, Fla.

Prime factors that the processor must watch if he aims to achieve a tangerine juice with highest retention of flavor, color and vitamin C have now been spotlighted in experiments conducted by members of the Florida Citrus Commission.

Particularly notable in these studies have been the careful evaluations of the several commercial processes.

The findings emphasized the roles played by the five factors—pasteurization, deaeration, deoiling, packaging and storage. It was revealed that—

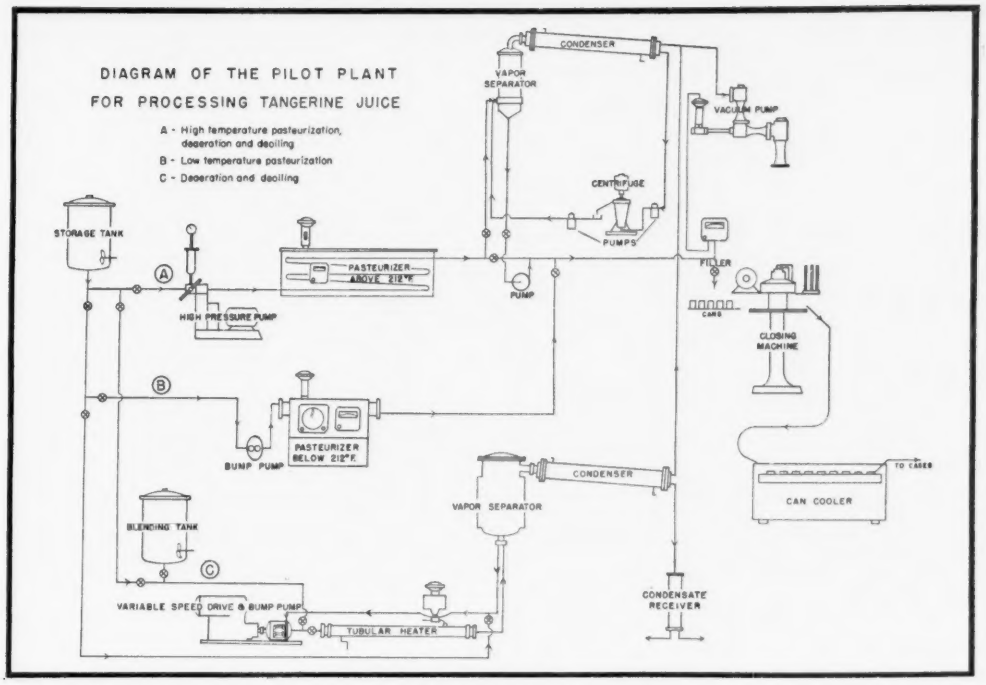
- **Simultaneous pasteurization, deaeration and deoiling efficiently remove peel oil from the juice.**
- **Deaeration aids in retention of ascorbic acid and reduces foaming at the filler.**
- **Plain tin cans keep the juice better than enameled cans.**
- **Storage at 40 deg. F. results in better retention of flavor, color, body and ascorbic acid than storage at 80 deg. F.**

It was during the 1943-1946 seasons that members of the Commission explored possible ways of canning tangerine juice which would result in retention of its flavor and provide a basis for future experimental work on this subject. And they developed a method in which the juice was simultaneously pasteurized, deaerated and deoiled by heating to about 240 deg. F. and flashing into a chamber under 9 to 11 in. vacuum. This removed the air and a large percentage of the peel oil and, at the same time, cooled the juice to a filling temperature of 190 to 195 deg. F.

At the start of the 1946-47 season, a pilot plant (see photo) of approximately ½ gpm. capacity was built for processing tangerine juice by several methods simulating those in commercial use for canning citrus juices. This unit was also designed for continuing work on the above-mentioned pasteurizing, deaerating and deoiling process.

Using this pilot plant, nine experimental runs, consisting of 45 juice packs, were made to study the effects of deaeration, deoiling, pasteurization

how it simulates the different commercial processes



LAYOUT OF EQUIPMENT shows the several paths juice followed, depending upon the temperature, other treatments.

temperatures, methods for simultaneous pasteurization, deaeration, and deoiling with and without return of water phase of the centrifuged condensate; and finally, packaging in plain tin and citrus enamel cans. Juices were pasteurized at temperatures ranging from 200 to 240 deg. F., canned at 195 to 200 deg., and immediately cooled to between 65 and 88 deg.

Tangerines employed in the experiments were grove-run fruit from a nearby packing house and grove-run fruit from "standard practice" plots of the Citrus Experiment Station, Lake Alfred, Fla. The former were stored at 40 deg. F. for approximately one month; the latter were also stored at 40 F. but were processed in one to two weeks.

Juice was extracted with a rotary press and separated from seeds and gross pulp by a tapered-screw press using several size screens.

For pasteurizing below 212 deg. F., juice was pumped at a constant rate (½ to 1½ gpm.) through 78 ft. of ⅜ I.D. stainless tubing. The first 28 ft. of this tubing was coiled and enclosed in a 4-in. dia. x 4 ft. water jacket. Water in the jacket was heated with steam, and the temperature was controlled automatically. The remaining 40 ft. of the tubing was coiled and insulated. At a flow of ⅔ gpm., juice was heated in 4.8 sec. and held for 5.2 sec.

For temperatures above 212 deg. F., juice was pumped, at a pressure of 400 to 600 psi., through 80 ft. of ⅛ I. D. stainless tubing. The first 40 ft. (heating unit) was enclosed in 8-ft. sections of ¾-in. pipe equipped with steam inlet and condensate outlet. The remaining 40 ft. was similarly jacketed, but provided with water inlet and outlet. Temperatures in pasteurizing and cooling sections were automatically controlled. A flow diversion valve, located between the heating and cooling sections, directed the hot juice to the vapor separator when flash-boiling was desired.

High-Temperature Deaerator-Deoiler

The vapor separator for deaerating and deoiling the pasteurized juice (12 in. dia. x 28 in. high with conical ends) was designed to operate under 5 to 11 in. vacuum. Juice enters tangentially through a ⅜ in. orifice. Juice was pumped from the vapor separator to the can filler spout by a centrifugal pump.

For vacuum, there was a 3-stage hydro-steam pump with two steam-jet exhausters discharging to the atmosphere.

After pasteurizing, all juices were filled hot into 9½-oz., 1.25 hot-dip tin plate, plain or citrus enamel cans. Cans were then inverted for 32 to 52 sec. before they were cooled. Temperature of water in the cooling bath varied from 65 to 80 deg. F., and the time cans were in bath varied from 6 to 7 min. After cooling, cans were packaged, 24 to the case, and a part of each pack was placed in storage at 40 and at 80 deg. F.

Examinations were made of the canned juice to check on vacuum, headspace, ascorbic acid, pH, recoverable peel oil, Brix, total acid, color, pulp, and flavor.

Vacuum and headspace readings were not made initially, but after 3-, 6-, and 12-months of storage. Vacuum readings were slightly erratic, and there were as wide variations between cans in the same pack as between different packs. For this reason, the vacuum measurements have been averaged, as have also the headspace measurements (see Table I).

Retention of ascorbic acid at time of processing was 98 percent for the 22 packs in plain tin, and 94.6 per-

TABLE I—ASCORBIC ACID RETENTION Is Higher When Juice Is Packed In Plain Tin and Stored At 40 F.

Storage Period, Months	Storage at 40 Deg. F. — Plain Tin — Ascorbic Acid Mg. Per 100 Ml.	Ascorbic Acid Retention Percent	Vacuum Inches	Gross Headspace 16th's Inches	Storage at 40 Deg. F. — Enamel — Ascorbic Acid Mg. Per 100 Ml.	Ascorbic Acid Retention Percent	Vacuum Inches	Gross Headspace 16th's Inch	Storage at 80 Deg. F. — Plain Tin — Ascorbic Acid Mg. Per 100 Ml.	Ascorbic Acid Retention Percent	Vacuum Inches	Gross Headspace 16th's Inch	Storage at 80 Deg. F. — Enamel — Ascorbic Acid Mg. Per 100 Ml.	Ascorbic Acid Retention Percent	Vacuum Inches	Gross Headspace 16th's Inch
0	18.6	100.0	...	...	18.2	100.0	...	...	18.6	100.0	...	...	18.2	100.0	...	...
3	18.7	100.5	9	4	17.6	96.7	9	4	17.8	95.7	8	4	16.1	88.5	9	4
6	18.3	98.4	11	4	16.4	90.1	10	4	16.6	89.2	9	4	14.0	76.9	9	4
12	18.4	98.9	11	4	17.1	94.0	12	4	15.2	81.7	11	4	13.5	74.2	12	4

TABLE II—FLAVOR of Canned Juice Deteriorates At 80 Deg. F.

Storage Period Months	Storage Temperature 40 Deg. F. — Plain Tin Cans	40 Deg. F. — Enameled Cans	80 Deg. F. — Plain Tin Cans	80 Deg. F. — Enameled Cans
0	Good to fair	Good to fair	Good to fair	Good to fair
3	Good to fair	Good to fair	Fair to ordinary	Fair to ordinary
6	Good	Good to fair	Ordinary	Ordinary to poor
12	Fair	Fair to ordinary	Poor	Poor to very poor

cent for the 23 packs in enamel. This does not take into account the slight concentration of juices that were flashed under vacuum, but does represent an average figure for the juices processed under numerous conditions in the experiments.

Results of non-deaeration and deaeration experiments, indicate that deaeration may have a beneficial effect on ascorbic acid retention during processing, as well as aiding in reducing foaming at the filler. Here are the figures:

Treatment	Average Retention of Ascorbic Acid In Juices During Process (Percent) Plain Tin	Enamel
Non-deaerated.....	94.4	94.1
Deaerated.....	98.9	96.8
Deaerated, then air beat back in.....	94.4	93.3

These results also indicate that, once a juice is deaerated, any further operations that incorporate air may have a detrimental effect on ascorbic acid retention.

Results of storage on ascorbic acid retention have been averaged (Table I). Retention was higher in juice packed in plain tin cans than that packed in enameled cans. For example, at the end of 12 months storage at 80 deg. F., retention of ascorbic acid in plain tin cans was 82 percent; in enameled cans 74 percent. At 40 deg. F., average retention was 99 percent in plain tin cans and 94 percent in enameled cans. No explanation is offered for the apparent increase in ascorbic acid content of samples stored in enameled cans at 40 deg. F.

As regards temperature of pasteurization, no flavor difference was noted, whether the juice was deoiled, or whether the condensate was discarded or centrifuged free of oil and the water phase returned to the flash chamber.

Changes in pH between examinations at the end of 3 and 12 months were not significant, regardless of pasteurization temperatures, packing in plain tin or enameled cans, or temperature of storage.

Recoverable peel oil was determined initially on some of the fresh juices, also on the juices canned in plain tin, for each processing variation. The deoiling processes used resulted in removal of up to 80 percent of the peel oil.

Brix and acid varied according to the ripeness of the fruit. Tangerines obtained on Dec. 11, 1946, gave juice of 10.2 Brix, with acid content of 0.75 percent; those obtained Jan. 21, 1947, gave juice of 11.8 Brix and acid of 0.66 percent; those on Jan. 30, 1947, gave juice of 12.2 Brix and 0.66 acid.

Color of the canned juice stored at 80 deg. F. showed a greater tendency to bleach than that stored at 40 deg. And, in several instances, juice packed in plain tin showed a greater bleaching than the corresponding samples packed in enameled cans. Many of the samples resembled orange juice in color more than tangerine juice.

Appearance of cans. After storage of the canned juices for 12 months at 40 deg. F., all cans appeared to be in good condition. After storage at 80 deg. F., however, all enameled cans showed considerable pinholing and blistering, with no apparent significant difference between packs. There was no flaking off of any of the enamel. All plain tin cans showed considerable etching.

General appearance of juices. After 12 months of storage at 40 F., all juices showed some coagulation of solids. After storage at 80 deg. F., all of them also revealed some coagulation of solids, varying from complete coagulation (in the case of juices from the second run that had been deaerated, deoiled and the water phase of the condensate returned to the juice) to very slight clarification (in most of the samples produced from the second and third batches of fruit).

Flavor: Cooked taste. Juices that had been deaerated and deoiled to 0.004 percent oil or below prior to pasteurization and those that had been flash-boiled to 0.006 percent oil or below, were judged to have no cooked taste, and the type of can was not a factor.

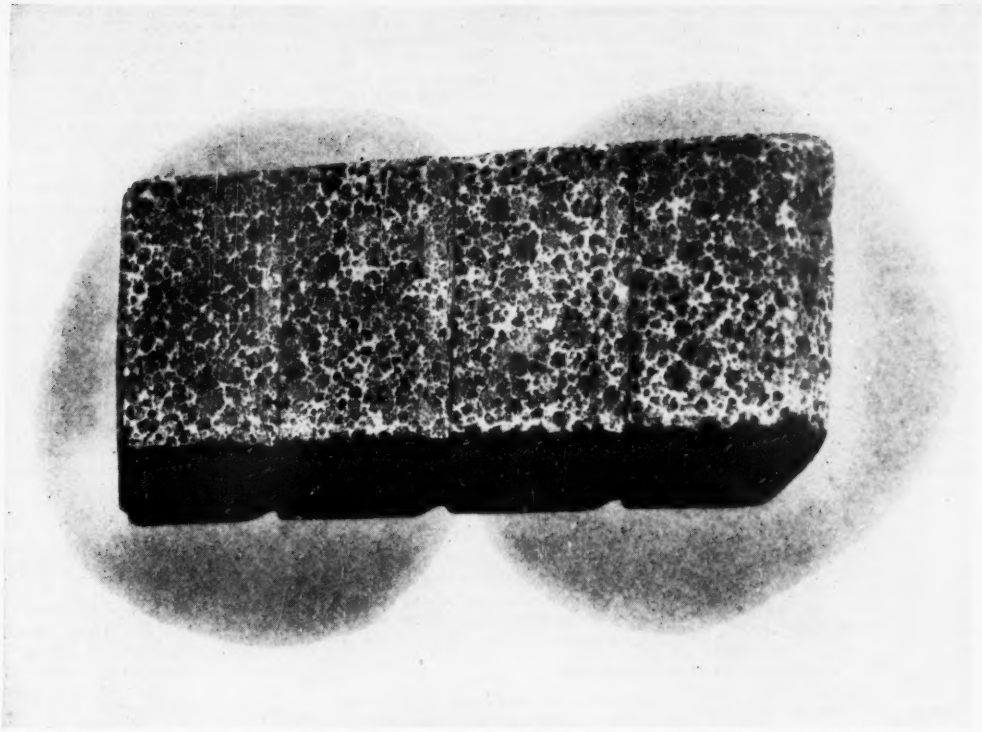
Flavor: Peel oil. A peel-oil content of 0.005 percent or below was difficult to detect; the most pleasing flavor appeared to be in the range of 0.005 to 0.010 percent. Between 0.010 and 0.030, the juice was scored as slightly oily, and juices containing more than 0.030 percent peel oil were judged very oily.

Flavor: Body of juice. Most of the juices were judged to have a light body. An analysis of the results indicated that the Brix had more to do with the body than did the size of the screen used.

Flavor: Preference and over-all ratings. According to the preference of the four tasters, it appeared that the quality of the juice became better as the season progressed (over-all flavor ratings are given in Table II). Those samples stored at 40 deg. F. for 12 months were considered to average slightly-off in flavor, whereas those stored at 80 F. were distinctly-off in flavor.

At 6 months storage and thereafter, the average preference was for juices packed in plain tin over those packed in enameled cans. The juices that had been simultaneously pasteurized, deaerated, and deoiled had the same flavor retention as the juices that had been deoiled before pasteurization.

Acknowledgement: The American Can Co. generously cooperated in this work by furnishing certain necessary equipment, and its help is hereby acknowledged.



DISCOLORATION and "oiling off" of chocolate. Prevent these evils and you insure candy's appeal to the fighting man.

Taste – No. 1 Combat-Food Ingredient

And to help augment and retain it in our military rations, industry research is invited to contribute its skill on the QM's General Products "firing range"

WILBUR L. DuBOIS,
General Products Div., QM Food & Container Institute for the Armed Forces, Chicago.

At present, approximately 40 different general products are listed for development and use in military rations. These items are not easy to classify as basic components of a meal. However, their role is significant in that the working out of acceptable packages for the armed forces would be difficult unless some items from this list are included.

Candy is one of several such items. In some rations, as illustrated by the "survival ration," over one-half of the nutritive value is supplied by candy. With other rations, the nutrition factor may be less important, but yet be substantial.

We will get the picture by specifically discussing these basic categories—

- Confections
- Spices and Condiments
- Beverages
- Protein Hydrolysates

In confections, the need is multiform. One requirement is for candy bars that are as "fresh from the manufacturer" as can be obtained, with packaging protection to guard them as completely as possible from unfavorable atmospheric and storage conditions with respect to heat, moisture and infestation.

Another need is for a stable coating for the candy bars, such as an improved "summer" coating and a "non-blooming" chocolate.

A third need is for a caramel and a fudge which do not dry out and become too hard to eat.

These three needs are not all the problems in connection with confections, but they can be regarded as the major and more pressing ones at present. Some headway has been made toward meeting these needs.

The first move has been to determine what existing candy bars show maximum resistance to the effects of varying heat and moisture conditions. Through studies made with the aid of a series of cabinets in which climatic conditions can be simulated, several candy bars have been found to have sufficient stability and have been added to the military rations. However, others are desired to give variety.

One improved "summer" type coating is now available, and the relation

of the smoothness of this coating to heat-resistance is being studied. The investigation is continuing on the basis that the stability of the cocoabutter in the coating increases as the sugar particles are progressively reduced in size. There is the possibility that the "bloom"-resistant properties of chocolate coatings can be increased if the sugar particles can be reduced to 35 microns in diameter. Assurance of holding chocolate and chocolate-coated confections at approximately 60 deg. F.—at which temperature "bloom" is prevented or at least materially retarded—is impossible in military storage facilities because refrigeration is often lacking.

Some recent samples of caramels and fudge show promise of increased shelf or storage life, but greater and more dependable improvement is needed.

Confections warrant special consideration and study for improvement. They are ration items usually eaten even under combat conditions when other less palate-appealing foods may be thrown away. In addition to being high in carbohydrates and containing appreciable quantities of other nutrients, candy is a concentrated food and is conveniently carried. For these reasons it is used in practically all military rations, is specifically adapted for use in those situations where a soldier is on his own for short periods, and provides 58 percent of the nutrients in the 22-oz. survival ration package.

Assistance is being given by the National Confectioners' Assn. through a committee appointed to help in working out specifications and obtaining candies suitable for military use. However, industry assistance to the solution of candy ration problems need not be restricted to the efforts of this committee.

Spices

Pepper appears to be posing the most important problem among the spices as far as developing an alternative or substitute is concerned. The problem is to obtain an imitation black pepper as fully independent of the natural spice or derivatives as possible.

An attempt is now being made to assemble those components of natural pepper that are apparently essential to the synthesis of a good imitation. Some of these component compounds are already available, whereas others must be synthesized. Four of them have already been prepared. Success involves the preparation of imitation peppers which will compare favorably with natural pepper in flavor, pungency, and stability and make the armed forces independent of the Oriental supply, which may again be cut off.

Condiments

Also important for increasing the palate appeal of military rations are the table sauces. Worcestershire appears to be the favorite. But it varies so greatly in makes and quality that there is need for the establishment of specifications which will assure uniformity in composition and quality. The problem is to determine what composition and method of making results in a sauce of the best quality.

Solution of the problem involves determination of range of chemical analyses, identification of ingredients used, comparison of experimental formulations with best commercial products, and the carrying out of stability and acceptability tests.

With respect to both protein hydrolysates and Worcestershire sauce, a study of soy sauce is desirable to determine its composition and flavoring values. A component of Worcestershire sauce, it is a product of vegetable protein hydrolysis. It has limited use as an individual item in military feeding. Manufacturers of table sauces can contribute to the establishment of specifications by commenting on and making suggestions in reference to the sauces under test.

Soluble Coffee

Problems in obtaining a good soluble coffee include those of aroma, identity of factors responsible for the flavor and aroma of fresh coffee, method of obtaining a powdered extract, and packaging technic to give the product maximum storage life.

Approaches to the solution of these problems invoke several studies. A basic investigation is to identify the constitutents responsible for the flavor and aroma of freshly brewed coffee. The chief difficulty is with aroma, which is lacking in even those soluble products having a recognizable and good coffee flavor—although not quite the fullbodied flavor of the fresh coffee brew. These approaches involve blends of coffee beans, roasting equipment and methods, extraction and drying means and methods, and packaging materials and technics.

Of all the factors involved, the extraction and drying operations and methods may possibly have the most significant effect on the quality of the finished product. Application of heat in both steps very likely has a deleterious effect, even if only through volatilization of the aromatic constituents. For that reason low-temperature (freeze) drying of the extract by infrared radiation may be the way to retain the flavor and aroma constituents of the extract.

Furthermore, an extract made with 70-deg.-F. water shows more promise of retaining the desirable coffee characteristics than that made with hot water. However, a difficulty with the cool water extraction is the impractical low yield obtained. Needed is a feasible method of cool water extraction building up to a yield somewhere near that obtained by hot water.

Protein Hydrolysates

There are definite flavor characteristics of protein hydrolysates especially desirable in such products as dehydrated soups, bouillons, soya sauces, soup stock bases, and gravy bases. However, the characteristics and compositions vary considerably, depending on the source of the protein and on the extent of the hydrolysis. For that reason, it becomes necessary to investigate and evaluate the whole range of hydrolysates. One extremely important objective is to clarify the possible relationship between the protein solids used and palatability of the resulting hydrolysates.

Industry can help, in fact already is aiding in the study of hydrolysates and their properties.

A forward-looking move for the solution of these specific problems has been made through the Associates of the Food & Container Institute. A committee of leading manufacturers of soluble coffee has been set up to aid in producing a better soluble product for military use. In that way, helpful use may be made of accumulated experience and data.

Soluble coffee is a highly desired item for the military ration, because regular coffee-making equipment and facilities are not available under many conditions of field and battle-front operations. Further, coffee in some form is the most commonly used beverage throughout the entire military establishment.

As in the case of the confections, the flavoring spices, the protein hydrolysates, and condiments, an improved soluble coffee is desired to add as much variety, concentrated nutritive values, and palate appeal as possible to the military ration.

"Just As Important"

The appetite-appeal requirements outlined in this fifth of a series on key problems in the development of adequate foods and containers for the armed forces are just as important as the incorporation and retention of nutritive values. For unless these rations are attractive to the taste they will be eaten only sparingly—if they are eaten at all.

A SPECIAL FOOD INDUSTRIES REPORT

PRESENTATION of papers on technical advances gets under way as President Carl R. Fellers calls first general session to order. Shown (seated) at speakers table are (l. to r.) Samuel C. Prescott, Founder of IFT; Charles L. Smith, American Can Co.; Ernest H. Volwiler, President American Chemical Society.

Annual IFT Meeting Accents

TECHNICAL PROGRESS

Scores of significant new developments in the field of food processing were revealed at the Decennial Conference of the Institute of Food Technologists. They are presented here in capsule form to keep you abreast of progress.

FI STAFF

Reflecting continued rapid progress in food technology, the Decennial Conference of the Institute of Food Technologists was highly successful. Not only was a great amount of new information reported, but the meeting was well attended. Registration at this meeting in Chicago, May 21-26, totaled 1,225, of which 923 were paid registrations representing 728 IFT members, 87 nonmembers, 13 student members, 32 student nonmembers and 63 ladies.

No less than 115 papers were given, plus 15 addresses at the opening general session and at the luncheon and banquet meetings.

Two awards were given. The Babcock Award went to Carl R. Fellers, and the Nicholas Appert Medal was presented posthumously to Thomas M. Rector.

There were 50 exhibits at the exposition held in conjunction with the conference.

Food Technology Moves Ahead—The rate of progress in food technology was highlighted in the presidential address of Carl R. Fellers, head of the Department of Food Technology, University of Massachusetts. He pointed out that in the past 10 years the profession of food technology has become recognized by name in many places, such as state and federal civil service commissions, government bureaus, universities, the various branches of the food processing industries, the military, and by other technical societies.

There also has been a significant increase in the literature of the profession, Dr. Fellers observed. Twenty years ago, hardly anything was available as source material for teaching, but in the intervening years hundreds of text and periodicals pertaining to food technology have come into existence.

Discussing trends in teaching, Dr. Fellers stated that the food technology department should include the handling of all processed foods, not merely a part of them. The same unit processes and fundamental principles of producing, processing and distribution are used for foods—whatever

the source. And experience shows that there is need for, and a place for, the food technologist. It is he who translates science, engineering and management principles to the business of food processing.

Evaluating Safety of Chemicals—Food processors who use chemical ingredients in their products face the same problem of protecting public health as do pharmaceutical manufacturers, it was pointed out by Dr. E. H. Volwiler, head of Abbott Laboratories, and president of American Chemical Society. The pharmaceutical industry has long been accustomed to filing with the Food & Drug Administration extensive research data, often requiring years to complete, on the safety of each new product. And similar research is becoming increasingly important in the food industries. In fact F&DA will require even more comprehensive research on the part of food manufacturers, since there is less control over the consumption of food products.

As an example of caution in the drug field, Dr. Volwiler told of the restraint employed by his company in introducing a new synthetic sweetening agent which, like saccharin, has no caloric value. This was fed to rats for more than two years and to dogs for a year or two. Then it was tested clinically preparatory to being used in a small way to sweeten some pharmaceutical products. The next step was to prepare it as a drug in tablet form, after which comes the use of the sweetener in certain dietary foods.

Dr. Volwiler suggested that the food and pharmaceutical industries work together more often, keeping the way open for further exchange of ideas to "benefit us both in our effort to promote the welfare of the American public."

Trends in Technical Education—There may be a shortage of engineers after 1952, in the opinion of Henry T. Heald, president, Illinois Institute of Technology, who discussed modern trends in technological education.

Because of the need for engineers in industry, Mr. Heald believes that industry should give more thought to assisting the institutions of higher learning. They should support cooperative education programs, encourage outstanding employees to attend evening courses, establish fellowships, and make unrestricted gifts to schools. Businessmen also should encourage bright young workers to attend college, particularly where such workers are from noncollege families who may not realize the opportunities offered by higher education.

Engineers are very much more likely to attain executive positions than any other technologists, Mr. Heald said. He also pointed to a trend toward less specialized education, with later specialization on the job. And there is an increase in postgraduate work, with a strong demand for people with such training.

Technical Highlights—Outstanding new technical information and worthwhile practical ideas which came out of the conference are reported in the following paragraphs.

Chemicals in Foods and Packages

Pesticides in Foods—Of particular concern to the food technologist is the group of new pesticides for which methods of analysis are lacking and which impart to the food product off-flavors which cause adverse consumer reaction. This was pointed out by W. A. Brittin, Beech-Nut Packing Co., who gave as the chief offender benzine hexachloride.

The latter is a very effective insecticide, but it cannot be removed by washing or peeling, since it penetrates into the flesh of the fruit or vegetable. And in most cases its presence is not known until the product has been heat treated. Recent tests with peanuts grown on land receiving benzine hexachloride mixed with fertilizer showed the nuts to be unfit to eat because of the musty, earthy flavor imparted by the BHC.

Mr. Brittin heartily endorsed the federal hearings being held to study tolerance requirements for various pesticides. And he expressed the belief that the pesticides of the future should not be presented to the market without adequate toxicity studies and until relatively simple chemical methods of analysis for detecting the chemicals have been developed.

In certain areas, crops will pick up selenium from the soil in sufficient quantities to make their safety doubtful. And this problem is complicated by the fact that selenium has been offered as a pesticide.

Another problem requiring further investigation—nitrates in foods—has come up during the past year. The nitrate content of some vegetables grown in New York state, such as beets and spinach, have been found quite high.

Guarding Flavors in Packaged Foods—Although the chemicals and chemical agents of concern to the Food & Drug Administration are not contributed to packaged foods by the containers, occasionally an obscure flavor change has been traced to the package, according to L. V. Burton, Packaging Institute, Inc. And food technologists should be familiar with the art and science of packaging so that they can cooperate with package suppliers to avoid such difficulties.

Most of the problems arise with flexible packaging materials, and the following are some of them.

1. A product wrapped in laminated foil-glassine acquired an off-flavor from the laminating adhesive.
2. Plasticizers used in films have caused off-flavors to develop.
3. A plastic container in which salad dressing was packed absorbed one of the flavoring ingredients, spoiling the taste of the product.
4. Where the paper in a food package contains sizable percentages of old scrap paper, it may contain undesirable substances.
5. Some packaged foods have been known to taste rancid without having developed rancidity—by reason of leakage of fat into paperboard, where it quickly rancidified. The odor then permeated the food.
6. Fat-containing foods are the most likely to pick up off-flavors from packaging materials. These off-flavors may be: (a) Normal paper odor, (b) chemicals used by the paper maker to restrain growth of slime bacteria in mill streams, and (c) chemicals or odors existing in the scrap paper itself. Some food processors use a waxed paper liner, while others consider a patent coating on virgin pulp adequate.
7. Phenolic compounds in paperboard have been known to render tea and cocoa unfit for consumption.
8. Diphenyl-impregnated wraps on citrus fruits have produced off-flavor.
9. Off-flavor in ice cream has been traced to printing and stamping inks used on containers.
10. Mayonnaise once picked up a medicinal odor and flavor from newsboard in a cap liner, the trouble being traced to the presence of hexachlor-benzine insecticide in the board.

Not only are there no chemical health hazards in packaging materials at present, but no infectious disease has ever been attributed to paper used in food packages.

Effect of Insecticides on Flavor—Off-flavors imparted to fruits and vegetables by some of the newer insecticides were discussed by W. A. Gould, Ohio State University. Vegetables tested were: Tomatoes, lima beans, carrots and potatoes. Fruits were peaches and plums.

CARL R. FELLERS (left) grins after receiving Stephen M. Babcock Award and check for $1,000. Presentation was made by C. G. King (center), Scientific Director, The Nutrition Foundation. Dr. C. A. Elvehjem, U. of Wisconsin, prefaced award with a paper, "Stephen Babcock," prepared by E. B. Hart.

COL. R. A. ISKER presents Appert Medal to Mrs. Thomas M. Rector in recognition of the late Mr. Rector's contributions to food technology.

Fruits and vegetables were harvested at optimum stages of maturity, delivered to processing laboratory, and canned according to accepted commercial practices. After 3-months' storage, samples were evaluated for off-flavor by a panel of twelve previously trained testers. Of the insecticides tested, only BHC gave off-flavors to both root and other vegetables.

Consumer Reaction to Chemicals—To the consumer, chemical agents and residues in foods means that something unnatural is there, according to A. A. Schaal, Good Housekeeping Bureau. Whether they were added for nutritional or functional value, or both, is not too important. Wetting agents, emulsifiers, stabilizers, improvers, preservatives, anti-oxidants, anti-biotics, and others, all mean about the same thing to the housewife — something added for some purpose.

She knows little about acute food poisoning and less about chronic poisoning. She may have encountered acute toxicity with its dramatic features and be unaware of a cumulative poisoning which lacks such symptoms. She hopes that poisonous foods or substances can be avoided.

Consumers seem to place greatest dependence on two factors—the manufacturer and the federal, state or local health control. Many rely on both, with the thought that official agencies always watch over the manufacturer. This is a plea that the manufacturer and governmental bureaus work together, with the aim that such a fine job will be done by the first as to minimize the need of the second. Progress toward utopian safety in foods may well develop in this direction.

Problems in Candy Making

Stabilizing Fats in Candies—An outline of tests to delay rancidity of fats added to candies by the use of suitable anti-oxidants was reported by Helen M. Robinson, Southern Regional Research Laboratory. To get results in a shorter time, rancidity was accelerated by adding traces of copper stearate to the fats. Results of the accelerated tests are being checked over a long period with candies without the copper accelerator.

Hard Candy Hurdles—Controlling the effect of "doctors" such as corn syrup and invert sugar in counteracting the tendency of hard candies to crystallize is where confectioners have most of their problems, reported A. V. Cramer, F & F Laboratories. Too much doctor may result in a highly hygroscopic candy with poor eating quality. Not only that, the candy will be difficult to handle and it will have a short shelf-life.

Cooking is another problem. Here, because some sugar inversion takes place, the problem involves the use of proper time, temperature, and pH. Control of these conditions must also require consideration of raw materials. Reducing sugar and moisture content of the finished product has been found most useful in gaging the efficiency of these control measures.

Toward New Uniformity in Chocolate—Work is now underway by the Inter-American Cacao Center to set up standards for methods of producing uniform quality cacao beans, according to Justin J. Alikonis, Paul F. Beich Co.

Such standards are needed because technologists have little or no control over primitive methods of fermenting the beans in producing areas. Most important process in bringing out the flavor in chocolate is roasting. And continuous roasting produces the finest flavor that has been attained in roasted cacao beans.

Today, modern refineries are getting better control in grinding the nibs by using aluminum oxide triple mill stones instead of natural French burr stones. The aluminum oxide stones can be quickly cleaned with diamond-impregnated wheels.

How to Ban Chocolate Bloom—To eliminate bloom on chocolate, 85 percent of the crystallizable fat must be crystallized, according to calorimetric measurements reported by Harvey A. Neville, Lehigh University. It was also discovered that bloom contained a fat with a higher melting point than that of cocoa butter. X-ray diffraction studies also indicated that bloom removed from chocolate is crystalline in structure. And in a systematic study of tempering conditions, a minimum time was found for stable crystals to form at a given temperature.

Chocolate can be tempered by holding it at 86 deg. F. for 2½ hr. But at least 3¾ hr. is required at 87.8 deg. F. Certain additives increase the stability of fat crystals in properly tempered chocolates and reduce its tendency to bloom when it is subjected to unstable conditions. Certain sorbitol derivitives have been found most effective. Other tests to promote stability point to the possibility of modifying the cocoa butter, or a portion of it, by hydrogenation, fractionation, or isomerization.

Camera Reports "Extra Session"—Monday Night's Mixer

Old acquaintances were renewed as IFT members and their wives relaxed and frolicked at Monday night's mixer. Entertainment was provided by groups from several of the sections. And now for some close-ups—

Tete-a-tete: L. V. Burton, Packaging Institute, greets M. P. and Mrs. Vucassovich, Gorton Pew Fisheries.

Charles A. Clark, General Foods Corp., "poses" S. C. Prescott, former head, Department of Food Technology, M.I.T., for "Milwaukee ad."

"Front row seats" for H. A. Campbell, General Foods Corp.; C. Olin Ball, N. J. Agr. Station; and Horace L. Smith, Jr., Richmond, Va.

High in spirits: William A. Scarlett, Wallace & Tiernan Co.; Mrs. M. A. Laing; Milt Laing, Armour and Company; and Mrs. Scarlett.

Hitting sweet notes are Roy E. Moser, Jr., USDA; Louis B. Howard, U. of Illinois; and Mrs. Howard.

Following mixer technic, "Food Industries" entertains. L. to r.: A. K. Balls, Mignon M. Gill, S. D. Kirkpatrick, L. B. Howard, F. K. Lawler, J. H. Nair, W. E. Traendly. Seated: F. L. Seymour-Jones, L. V. Burton, Ira D. Garard.

Marshmallow Trouble Shooting—In the making of marshmallow, T. J. Otterbacher, Corn Product Sales Co., urged confectioners to bear in mind the moisture absorption properties of various sugars, corn syrup, invert syrup, and glycerine at different relative humidities. At high humidities, glycerine, corn syrup, and invert syrup gain moisture. He also cautioned them on the whipping characteristics of ingredients. Dextrose, sucrose, levulose, and maltose sugars give a hard, tough, sagging marshmallow. High conversion corn syrup, on the other hand, makes a good marshmallow. But dextrins in regular corn syrup makes the product tough. Soluble dextrins, starch paste, and gelatinized starch do not whip. Yet, ¼ to ½ percent gelatinized starch is a good stabilizer. More important than the bloom of gelatin is its cleanliness, its beating properties, and setting time. To get a stable marshmallow, it must be properly mixed. Fat added to marshmallow causes difficulty.

How To Improve Quality of Fish

Fish Spoilage and Its Control—Recent studies on the effects of low temperatures on fish spoilage bacteria have emphasized their psychrophilic nature, or their ability to grow at relatively low temperatures. This was reported by Ernest Hess, of the Fisheries Division of FAO. And lowering the temperature as much as 2 deg. F. at the ice-temperature range is as effective as dropping it 20 deg. at room-temperature levels. At 32 deg. F., fish will keep twice as long as at 37 F.

To protect fish quality, sanitary condition aboard fishing vessels and in fresh fish plants must be good. Then the fish must be kept at low temperatures through improved construction of the vessel's holds and more effective methods of storage and shipping. In some vessels, it takes 15 hr. for iced fish in the center of a hold to come down to 32 deg. And when fish are packed in wood boxes, 48 hr. may be required for cooling. Since there is a big loss in quality in the first 24 hr., quick chilling to as low a temperature as possible is of paramount importance.

Problems in Handling Shrimp—There is much room for improvement in shrimp quality through better handling and refrigeration practices. This was pointed out in a paper by E. A. Fieger, Louisiana State Agricultural Experiment Station.

Efficient washing of shrimp on the boat reduces the bacteria count by as much as 75 percent. And heading of the shrimp by the vessel's crew is recommended, since whole shrimp were found to contain 42,000 bacteria per gram compared to 10,000 for those headed by the crew.

Quality of the fish is impaired by bruising and crushing. This may occur in a 2-hr. drag where the net collects 2,000 to 3,000 lb. of shrimp, together with shells and other debris. The piling of shrimp and ice into 5 ft. layers also crushes the fish. And the less handling of shrimp, the better.

For the frozen product, quality is best when freezing is done on the trawler, although operators consider this too costly. Long-distance shrimping operations are particularly damaging to quality.

Mr. Fieger said that a storage temperature of minus 40 deg. F. was best for frozen shrimp, and in any event the temperature should not be above zero. He also suggested the use of moisture-proof containers as a means of eliminating glazing and still protecting quality.

The cause of black spot on fresh and frozen shrimp has been traced to a mold, and studies on its prevention and control are under way.

Effect of Storage on Frozen Fish—Physical and chemical changes affecting taste and texture of frozen fish occur during storage, and quality can be maintained only by proper packaging and storage conditions. W. H. Hampton, General Foods Corp., discussed these factors and outlined procedures which enable fatty fish to retain their quality for 6 months and non-fatty varieties up to 8 months.

Initial freshness is the most important factor, and fast freezing is essential for fish held in ice for some time. Then a constant storage temperature of minus 5 deg. F., or less, is needed, and ice glazes and good packaging materials help prevent dehydration and to some extent rancidity. In the latter case, chemical antioxidants, especially ascorbic acid, have found practical application.

Storage room conditions have an important effect on dehydration. The size of the room, the frequency of opening the doors, humidity, and coil area all play a part. Coil temperature should not be more than 10 to 15 deg. F. below room temperature if dehydration is to be minimized. Room temperature is important, too, since vapor pressure at minus 15 deg. F. is only half that at zero. Despite previous ideas, the lower the storage temperature the less the dehydration.

Proper Freezing and Transport of Fish— Present technics of handling fish destined to be frozen are seriously faulty, although know-how and facilities for doing the job properly are for the most part available, in the opinion of O. C. Young, Pacific Fisheries Experimental Station.

Mr. Young cited the Pacific halibut industry, where schooners may take 3 weeks for a single trip. Fifteen to 18 days old when landed, some of the fish is below the 33⅓ percent quality level. And the quality level of the whole of such a load will vary between 85 and 20 percent. The better fish are boxed and shipped to interior or Eastern markets, and deteriorate greatly before they reach consumers. Low quality fish often are frozen inland.

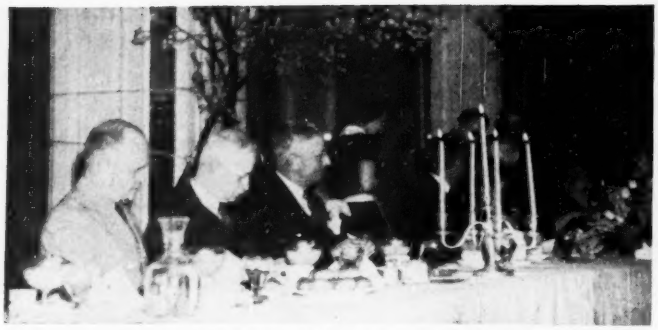
One practice which would raise the quality of frozen fish in general is to freeze quickly after catching. Facilities for doing this are available. It also is possible to store the product under conditions which preserve quality satisfactorily. Trucks and trailers capable of holding sub-zero temperatures are available for transportation, and suitable retail dispensing equipment can be had.

This situation, Mr. Young said, means that the role of the fisheries technologist must ever be that of the missionary or pioneer in quality improvement.

Processing With Ascorbic Acid—Successful commercial use has been made of ascorbic acid to retard development of rancidity in frozen fish, according to a paper by J. C. Bauern feind and G. F. Siemers, Hoffman-LaRoche, Inc. Shad fillets were immersed in a 1.5 percent solution for 10 sec. And at the end of 7 months' storage, the fish showed no rancidity and had a flavor definitely superior to the untreated product.

Fillets may be moved through the ascorbic acid solution by mechanical means, or large fish may be sprayed with the solution. For a small quantity, hand dipping is less expensive because less solution is used. The cost of ascorbic acid for hand dipping salmon fillets was placed at 0.42c. a pound.

Use of thickening agents, such as Irish moss extractive, to increase the viscosity of the solution has been found effective. Lake fish, as well as ocean fish, have responded to the ascorbic acid treatment.



NICHOLAS APPERT AWARD BANQUET was notable occasion. Left: Maj. Gen. W. H. Middleswart, Office of Quartermaster General; S. C. Prescott, MIT; and Roy C. Newton, vice-president Swift & Co. Right: Clarence Francis, chairman of board, General Foods Corp., and Mrs. Rohland A. Isker. Mr. Francis gave inspiring talk, "Thomas M. Rector —His Life, Work and Ideas."

Cathode-Ray Sterilization—When haddock fillets, heat-sealed in polyethylene bags, were sterilized with cathode rays, there was no significant destruction of the amino acids, according to a paper presented by B. E. Proctor, Massachusetts Institute of Technology. And the study made by Dr. Proctor and D. S. Bhatia indicates the possibility of sterilizing lean fish fillets on a belt moving under a cathode ray beam, without loss of nutritional qualities as far as amino acids are concerned.

Organoleptic tests revealed some effect on texture, odor and flavor of the fish, particularly at high cathode ray intensities. At a dosage of 900,000 Rep. (Roentgen equivalent physical) there was no change in either the appearance or texture of the fish, and only a slight cooked odor developed. At 2,700,000 Rep., there was a slight bleaching of the surface of the fillets, the texture became slightly crumbly, and there was a marked cooked, oxidized odor resembling ozone. At 5,700,000 Rep. the surface coagulated, the fillets were very crumbly, and the cooked odor was very marked. As to flavor, four out of nine members of a taste panel did not detect off-flavor in the samples irradiated at 2,700,000 Rep. And it should be noted that such a dosage exceeds sterilizing requirements.

It has previously been proved that X-rays and cathode rays destroy organisms without appreciable temperature rise in the product. Enzymes in foods are only slightly affected. And while vitamins are damaged in dilute solutions they are more resistant in food products. The irradiation does break sulphur bonds and certain ring compounds.

Effective Sanitation in Food Plants

Dozens of practical pointers were presented in the papers and question-and-answer period of the session on sanitation in the food industry.

Curbing Insects in Confection Plants—Examples of good and bad sanitary practices were cited by Gerald Doolin, National Confectioners' Assn. Wooden equipment in general is considered too difficult to keep sanitary, and tongue-and-groove board construction is no barrier to insects. Enclosed equipment units and ducts contain hard-to-clean corners where dirt and dust can collect and insects grow. So full-width clean-out doors should be provided, and the enclosed space ought to be thoroughly cleaned each week to break the life cycle of the insects. Equipment should be raised, instead of standing directly on the floor, to permit cleaning underneath. And guards over gears and pulleys need to be easily removable for weekly cleaning.

Nut-picking tables are a source of trouble unless the belt guards are hinged, or easily removed, for cleaning underneath. Chocolate enrober cooling tunnels should have removable side panels for effective cleaning.

Trays for starch molds in the candy plant require special attention. As these are reused, the one at the bottom of the stack and in contact with the floor may get into the center of a stack at a later time. So the bottom one should be painted red for identification and kept on the bottom, or the trays should be stacked on a dolly, the preferred procedure.

Sanitary Processing of Frozen Foods—Food plant sanitation too often starts at the processing line, in the opinion of K. G. Dykstra, Birds Eye-Snider Div., General Foods Corp., who presented a paper co-authored by S. E. Smith. The microorganism populations of the fresh raw materials are high, but they can be reduced by using clean lug boxes. There should be a regular system of washing and inspecting these boxes between uses. Painting the boxes helps, but painting plus washing is much better.

It is a mistake to operate a pea viner without regular clean-ups, since such laxity will bring contamination of the peas. Precooling of vegetables may have bad results, unless the water and the equipment used are clean.

To reduce contamination in processing, Mr. Dykstra suggested that line checks on bacteria build-up be run early in the season to locate trouble spots. Then sanitation practices and checks for fast bacteria build-up should be arranged accordingly.

High-pressure cleaning sprays and other new tools will reduce the time required in plant cleaning. And in-plant chlorination is effective, although not a cure-all.

Mr. Dykstra recommended the use of a special cleanup crew operating under a sanitation foreman for most effective and efficient plant cleaning. And their work is facilitated with a clean-up chart with notes on special problems. Multiple-plant companies ought to have a sanitarian at each plant, with a sanitary engineer at headquarters.

"Built-In" Sanitation—How food plants can be designed to make sanitation easy and less costly was discussed by A. T. Waidelich, Austin

Co. To begin with, new plants should be located in an area reasonably free of dust and dirt and where there is plenty of good water and means of disposing of waste. A map showing the streams in an area and their flow volumes is helpful in choosing a plant site.

In planning the building itself, operations should be centralized under one roof. For a given floor area, one building has only half the wall area of four buildings, simplifying cleaning, air conditioning and heating, as well as eliminating inter-building handling and consequent exposure to contaminants.

A single-story plant also has less wall area than a multi-story plant of the same capacity, and sanitation problems are fewer. If a one-story factory has a wall area of, say, 15,840 sq. ft., its multi-story equivalent will have 23,760 sq. ft. of walls.

The single-story building has fewer pipes and ducts to complicate the cleaning job, and it has easy-to-clean drainage trenches. Water vapor is readily removed without complicated duct work, and the wider spans reduce the number of columns, around the bases of which dirt can collect.

Pointers on sanitary locker room design also were given by Mr. Waidelich. An excess of foot-operated wash-basins should be provided, and so located that employees pass them on leaving the locker room. Germicidal lamps ought to be mounted around the walls, terrazzo or tile floors should be used, and lockers ought to have sloping tops. Wash-basins also should be located in large processing areas to encourage personal sanitation.

In the plant area, floors and walls of brick or tile were recommended, with special acid-resistant jointing compound. Walls ought to be of light-colored tile and free of window trim to reduce right-angle intersections where dirt can collect.

High-intensity fluorescent plant lighting (35 to 100 foot-candles) is important to effective sanitation, since it shows up dirt. And lighting should be well distributed to avoid shadows where filth may go unseen.

Electrostatic filters are becoming a common means of removing dirt from air taken into a plant, these having an efficiency as high as 90 percent. But it is well to take the air through a standard impingement filter first. This makes the electrostatic precipitator still more effective and gives protection in the event of a failure in power.

Where objectionable odors occur in processing, the air near the source should be exhausted and replaced continuously with fresh air. Or the air can be passed through activated carbon cannisters to deodorize it.

In-Plant Chlorination Effective—Enlightening findings of a 5-yr. study of in-plant chlorination in operation in four canneries were reported by I. I. Somers, National Canners Assn. Effects on product color and flavor, and on corrosion of equipment, were studied at different concentrations of chlorine in process and clean-up water.

Break-point chlorination is effective in reducing bacterial count, and it practically eliminates formation of slime on equipment, thereby reducing clean-up time and labor. For best results in slime control, sprays directed against the return side of belt conveyors and bucket elevators are recommended.

As to flavor effect, certain products were found rather sensitive. However, none was affected if chlorination was limited to 5 ppm. and excluded from brines and syrups. Apples, figs, cling peaches, pears and vegetable juices are sensitive.

Line-Up of Leaders

OFFICERS, old and new (l. to r.) Treasurer, P. K. Bates, Cabot Chemical Co.; President-Elect, C. N. Frey, Standard Brands,; President, P. F. Sharp, Calif. Agr. Expt. Station; Retiring President, C. R. Fellers, U. of Mass.; and Executive Secretary, C. S. Lawrence.

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Editor-in-Chief, Food Technology and Food Research
Z. I. Kertesz, New York State Agricultural Experiment Station, Geneva, N. Y.

No effect on color of foods was found, nor any effect on pH and ascorbic acid at 5 ppm. chlorine concentration if excluded from syrup water.

Amount of chlorination used ranged from 2½ to 10 ppm., with an average of 5 ppm. in processing. In clean-up water, the concentration was as high as 30 to 40 ppm., with an average of 15 to 20 ppm.

Panel Answers Sanitation Queries—Interesting replies to questions from the audience were given by a sanitation panel consisting of the speakers, plus D. H. Little, Dried Fruit Assn., E. L. Holmes, American Institute of Baking, and Moderator Charles A. Clark of General Foods Corp. The answers follow:

1. Recirculating water can be chlorinated to advantage if not heavy in organic matter.

2. Residual insecticide on cloth is too slow in acting to prevent insects from passing through.

3. Mice can live without drinking water, having survived on dehydrated dog food during an experiment.

4. Corrosion of steel exposed to chlorinated water begins to take place if the chlorine concentration is 20-25 ppm. and the pH below 7.

5. Openings around pipes can be effectively sealed with a caulking material containing an insecticide and covered with a metal collar.

6. Sanitation programs among growers are underway in the dehydrated fruit and in the milling industries.

7. Sanitation can be designed into equipment at no extra cost. In one case, a machine redesigned for sanitation actually cost less to construct.

8. Spores ordinarily are not destroyed by chlorine.

9. Rodenticide 42 gives good promise of being safe for use by food processors. It kills mice only after repeated eating, causing the animals to develop internal hemorrhages and die. In one test, it wiped out the rat population in a dog kennel without harming the dogs.

10. Dust can be cleaned easily from overhead trusses by using a specially equipped lift truck to elevate worker to trusses. Also, a false ceiling can be installed under the trusses to prevent dust accumulation.

11. In-plant chlorination can be used in all types of water, as a general rule. However, if pH is low, corrosion may result. And if phenols or creosols are present, off-flavors may develop.

Outlook in Food for the Military

How War Would Affect Industry—Planning for adequate food production during any future emergency is a problem of mobilization to strike a balance in the employment of labor and in the utilization of our resources for food and industrial production, while maintaining professional services and military action.

These plans, said Col. H. Mackintosh, of the Quartermaster military planning division, include manpower to be drafted from agriculture, allocation and production of farm equipment and supplies, determination of rationing policies, price, export and other controls.

Food purchases for all military services have been centered in the Quartermaster Corps. And that agency also carries full responsibility for military subsistance, both with industry and with the National Security Resources Board. The Quartermaster, he said, is depending upon food industry's advice in developing plans that will be realistic and practical.

He spoke at length of the enormous World War II savings in materials, transportation and manpower, made possible by dehydrated foods. How to keep the facilities and know-how for the production of these foods available for an emergency, during peacetime, is one of the problems now confronting the planners. He urged the technologists to work on the development of improved dehydrating technics, which would result in more palatable dehydrated foods. The expected increased consumer acceptance would then result in the peacetime expansion of the industry, and thus increase the production potential available to meet any emergency.

Subsistence Problems Seen—In any future war, the U. S. must expect extensive destruction of its food processing plants and serious disruption of food transportation facilities, according to Maj. Gen. W. H. Middleswart, Office of Quartermaster General. And the middle-western production centers will be as vunerable to attack as those along the coasts. One of the questions to be faced is: Can the processing and packing of foods be accomplished at less vulnerable points should the big production centers be wiped out?

Touching on food contamination by atomic particles, General Middleswart said we did not yet have the full answer. At Bikini, however, food exposed to the tests showed no radioactivity in the presence of the Geiger counter nor did it have any ill effects when fed to rats.

Progress on Special Rations—Only one of the special rations used in World War II would be satisfactory in another war, according to Lt. Col. J. S. Kujawski, Commandant, QM Food & Container Institute for the Armed Forces. The B ration is still suitable for feeding rear area groups where kitchens are available. The old C ration has been greatly improved. The two cans of this ration, meat in one, biscuits in the other, are now packed in a single carton, eliminating the risk of a soldier getting the wrong can.

The K ration has been replaced by several packets, one of which is a streamlined 1-lb. packet for men in assault. Another packet is designed for air crewmen and airborne troops. Still another provides a ration for men in the field in sub-zero weather. The 10-in-1 ration has been halved in bulk and weight by making it a 5-in-1, while the D-bar's successor has not yet been decided.

New specification also call for powdered eggs that will remain stable for 18 months when stored at room temperature, and for 36 months at 40 deg. The former 3-way boneless beef has been improved and is now designated 4-way, with more of the fat removed. A dehydrated meat bar that requires no heating has been developed for troops in cold weather areas.

Other products soon to be classed in the rations include: Quickly rehydrated pea and bean soups, canned bread that remains acceptable as long as 24 months, and foil-wrapped bread that has remained acceptable for more than 100 days.

Among the current problems, Colonel Kujawski mentioned needed improvement in the canned meat items for special rations, newly developed cereal products, more stable premixed cereals and data on quality standards, and flour dehydrated to a moisture level of 2 percent to improve the storage life of prepared cake mixes.

Needed dairy products include good stable bread spreads, milk fat that will hold up without refrigeration, evaporated milk that does not require turning in storage, and a good dried milk product that can be easily made into a glass of milk in the field. Other needs include better dehydrated fruits and vegetables, stable precooked dehydrated soups, acceptable dehydrated orange juice, better tasting soluble coffee, and an acceptable imitation black pepper.

CROSS-LEG CHAT. (L. to r.) James W. Kellogg, Iodine Educational Bureau; H. B. Switzer, Good Housekeeping Magazine; and J. C. Bauernfeind, Hoffman-La Roche, Inc.

REGISTERED and set to go. (L. to r.) Ernest H. Volwiler, Abbott Laboratories, J. H. Nair, Continental Foods, and S. D. Kirkpatrick, FI and "Chemical Engineering."

Better Canning Processes—And a Problem

Short-High Aseptic Canning—Extensive tests in cooperation with food processors have demonstrated the effectiveness of continuous short-time high-temperature sterilization of fluid foods, followed by aseptic canning. This was reported by W. McK. Martin, Schwarz Engineering Co.

The product is sterilized by pumping it successively through heating, holding and cooling units in a closed pressure system. Then the cool sterile food is filled and sealed aseptically in containers sterilized with superheated steam at 450-650 deg. F. in an open system at atmospheric pressure.

A variety of products—including strained baby foods, vegetable purees, juices, soups and milk—have been packed experimentally. And these advantages have been attained: Better flavor, color and texture; as high product quality in large containers as in small, regardless of viscosity and consistency; economic use of fuel and cooling water.

Process conditions can vary widely without harming quality or risking spoilage. Relatively little floor space is required. And a high degree of mechanization and automatic instrumentation provides close control and saves labor.

Unforseen Corrosion in Caps—Something new in enameled tinplate caps on baby food jars was discussed by Edward F. Kohman, Campbell Soup Co. The perforations appear early after packing, and are extensive. Neither the pH nor the weight of tin coating has any effect on the rate at which perforations developed.

Studies indicate that the perforations are caused by a unique galvanic couple. The anode comprises the microscopic areas of exposed metal on the portion of the cap inside the jar. The cathode is the big area of the raw-cut, air-exposed periphery of the cap. An electrolyte between them is maintained through the seam. The corroding ionic current may pass through a capillary film of electrolyte at the interface between the gasket and cap or gasket and jar. A film of food liquid entrapped during closure may be the electrolyte. Or porosity in the enamel or gasket may absorb food liquid and conduct ionic current.

Further studies are directed toward preventing an ionic current from passing through the seal.

Induced Convection Heating—New technics permit cream style corn of superior quality to be processed in a continuous cooker in the short time of 14.5 min. at 262 deg. F. It generally takes 70 min. at 250 deg. by conventional methods. According to Paul C. Wilbur, Food Machinery & Chemical Corp., color is markedly improved, flavor closely resembles that of freshly prepared cream style corn, and thiamin content is higher.

Agitation of the can's contents while passing through the cooker induces convection, which speeds heat penetration and permits the short process. This agitation, in turn is made feasible by blanching, by a controlled heating rate during batch mixing, and by the use of a special corn starch which is an effective anticoagulant.

Since process conditions are related to consistency, close measurement of consistency is essential. So a new and precise consistometer was developed. This device has a constant-speed revolving platform on which a can is placed as taken from the filler. A spring-opposed paddle is inserted into the can at the axis of rotation, the angular displacement of the paddle being a measure of consistency. This displacement is indicated on a dial in the instrument's head. With the aid of this consistometer, it appears that cream style corn in all commercially desirable consistencies can be processed by the new short method.

In developing the process, studies indicated that heat coagulation of the soluble protein fraction is the cause of curdling and that agitation causes agglutination in the cooker.

And while the special starch appears to suppress even fine-grain curdling in the batch mixer, it is considered advisable to operate the mixer with low steam velocities through the injection jets. Size and number of jet openings should be increased to reduce manifold pressure to less than 12 psi.

Successful use of the process also requires: (1) Good fillers which leave minimum headspace of ¼ in. and do not entrap air in product. (2) Not more than a 5 min. time lapse between closing and processing. (3) Proper cooling and storage temperature to avoid spoilage by thermophilic organisms.

New Principle of Agitation—Process time for canned products is shortened by a new principle of agitation developed by Continental Can Co. and described by L. E. Clifcorn. Considerable improvement in texture, flavor and color of many heat-sensitive products has been achieved, since overcooking does not take place, even though temperatures of 260 deg. F. and higher are used. And thiamin retention is significantly increased. Among foods materially benefitted are whole kernel corn, various milk products and pureed vegetables.

Particularly applicable to the larger

can sizes, the technic involves end-over-end rotation of the can around axes outside the can. Speed of rotation is such that the centrifugal force acting on the can approximates the force of gravity. With such rotation, the headspace volume passes through the central position of the can and creates a maximum degree of turbulence. Can size and product viscosity determine optimum speed of rotation.

The technic does not damage the physical structure of delicate products.

With this method, peas are processed in 4.9 min. at 260 F. compared to 35 min. at 240 F. in the conventional process. For evaporated milk, the process is 2.25 min. at 260 F. compared to the usual 18 min. at 240 F. Thiamin retention in the peas was 81 percent, compared to 66 percent for the conventional process.

Peroxidase in Acid Foods.—The presence of the enzyme peroxidase in processed cucumber packs was found to deteriorate color, flavor and aroma during storage, in a study reported by E. A. Nebesky, W. B. Esselen, Jr., and C. R. Fellers, University of Massachusetts. And in the case of kosher style dill and processed dill pickles, the time and temperature of the process were found inadequate to destroy the peroxidase system. It was judged that perhaps other enzymes are not destroyed in these products either.

Preserving Vegetables With Subtilin—A new process of food preservation in which bacterial spores are destroyed by an antibiotic in combination with mild heat was described by Ariel A. Anderson, Western Regional Research Laboratory.

In this process, vegetables were prepared as for commercial canning, and were weighed into No. 1 cans. Subtilin, an antibiotic elaborated by *B. subtilis*, was incorporated in the brine to produce concentrations of 0 to 20 ppm. After brining, cans were either vacuum sealed cold, or given a brief steam exhaust and sealed hot. A cook of 5 to 20 min. in water at 206 to 212 F., followed by water cooling, completed the process. Packs of over 700 cans were made with peas, corn, asparagus, cauliflower, Brussel sprouts, broccoli, wax beans and mushrooms.

Packs were stored at room temperature up to 8 months, and some were given additional incubation at 122 F. Spoilage occurred only in controls and in samples with low subtilin concentrations and low heat treatment.

M. E. HIGHLANDS, U. of Maine; H. W. Nilson, Fish & Wildlife Service, College Park, Md.; and H. L. A. Tarr, Fisheries Research Board of Canada, Vancouver, B. C. stop to chat in lobby.

Advances in Freezing Methods

Dehydrofrozen Apples—According to Wm. F. Talburt, Western Regional Research Laboratory, dehydrofrozen apples have been found to be essentially equal to fresh, and better than frozen or canned apples, for pie stock and certain other leading uses.

In this method, apples are peeled, cored, sliced and the enzymes inactivated (preferably by dipping in sulphurous acid). Apple slices are then partially dehydrated to reduce their weight and volume by at least one-half, then packed in cans and frozen.

The partially-dried apple slices pack closely in cans—50-60 lb. can be packaged in a 30-lb. can. They do not drip or darken in subsequent freezing and thawing, and they can be easily rehydrated for pie stock.

Points on Frozen Apple Concentrates—In the absence of the authors, Wm. F. Talburt presented a report on preparation of four-fold apple concentrates by three different methods: (A) A 6-fold concentrate was prepared in a falling-film evaporator and cut back with fresh juice (method used in preparation of concentrated orange juice); (B) volatile flavors were stripped from juice at atmospheric pressure. Then both volatile flavors and residue were concentrated and recombined, and (C) a 6-fold concentrate was prepared as in (A) and cut-back with fresh juice and concentrated volatile flavors. Reconstituted juices from (B) and (C) were very good; from (A) were weak in flavor and aroma.

In preliminary experiments, the following points were observed: (1) There was no advantage in evaporating at an extremely low temperature—temperatures up to 130 F. produced no significant change in flavor; (2) freeze-concentration was tried, but no practical equipment is available; (3) most of the volatile constituents go off during concentration; (4) color of concentrate is lighter than natural juice; (5) a mixture of 70 percent Winesap and 30 percent Delicious apples gave the best flavored concentrate; and (6) depectinized juice was found most suitable.

Stopping Sucrose Hydrate in Frozen Fruits—Factors influencing the development of sucrose hydrate were discussed by Wm. F. Talburt, Western Regional Research Laboratory. The mold-like waxy, white crystalline deposits in fruit packs such as cold process frozen fruit spread made with 50 percent fruit and 50 percent sugar, and on the surface of gels and 3 + 1 or 4 + 1 pack strawberries and raspberries, have been identified as hydrates of sucrose.

Experiments on frozen fruit spreads showed that hermetic sealing, the use of a specific sweetener (30 percent invert, 70 percent sucrose), and storage at 0 F. all play important parts in prevention of sucrose hydrate formation.

Immersion Freezing—Experiments in which fruit and vegetable products in cans were frozen by immersion in $CaCl_2$ brine were described by Geo. S. Smith, WRRL.

In these investigations the effect of the following factors on freezing rate were determined: Brine temperature, brine velocity, rate of can rotation, manner of exposure to brine stream, kind of product, and container size. Comparisons were made between freezing rates in flowing brine and in an air blast.

Rates of freezing for stationary cans by the indirect immersion method were much greater than by the conventional air blast method. Rotation during immersion freezing resulted in large reduction in freezing time. Rotation had little effect upon non-liquid products. In indirect immersion freezing, position of container or variations in brine velocity are not critical. Products like strawberries are improved by rotating during freezing.

Feed and Storage Effects on Meats

Pre-Slaughter Treatment Improvement—Better quality meat was obtained from hogs which had been fed sugar and rested 12 to 24 hr. before slaughter, according to a paper by N. E. Gibbons and Dyson Rose, National Research Council, Ottawa.

The animals so treated had higher glycogen reserves in their muscles than those slaughtered in a fatigued condition. Post-mortem breakdown of these reserves produced lactic acid, which lowered the pH of the muscle to 5.4-5.8 compared to 6.0-6.6 for fatigued animals, while meat from rested but unfed animals developed an intermediate pH.

After curing under controlled conditions, meat from fed animals had better quality than that from fatigued animals. The nitrate content of the meat from fed hogs was lower and increased less rapidly during storage at 30 to 40 deg. F. The color of unsmoked bacon and ham from the fed animals was considerably more stable, and the meat had better storage life.

Longer Storage Life for Cut-Up Chicken—Stored in an atmosphere containing CO_2, cut-up chicken kept better than that stored in air, in tests reported by W. S. Ogilvy and John C. Ayres, Iowa State College. The storage index (ratio of keeping time in CO_2 to that in air), appeared to be directly proportional to CO_2 concentration, while the average generation time of slime-forming bacteria was a logarithmic function of the CO_2 level within the range 0-25 percent. But use of high CO_2 levels resulted in rapid discoloration of stored chicken. Reduction in storage temperatures, of course, increased the effectiveness of the CO_2 in retarding bacterial growth in stored chicken.

The study indicated that it would be an advantage in distribution to use CO_2 storage part of the time, since this would delay spoilage.

Bone Darkening of Frozen Chickens—After outlining briefly results of previous experiments on bone darkening in young poultry that had been frozen, thawed and cooked, Dr. J. G. Woodroof, Georgia Agricultural Experiment Station, discussed the effect of minerals and vitamins in the feed.

As the result of a large number of feeding tests, it appears that an excess of vitamin D in the feed increases darkening of the tissues. Addition of extra amounts of Ca and P to the diet produced similar results. Other contributing factors are: Age of bird at time of killing, rather than total weight or weekly gain in weight, and method of raising—meat of yard-run chickens discolored less than that of brooder raised ones. Method of cooking was found to have no effect on amount of flesh darkening of previously frozen chickens.

Cereal Technology and Baking Problems

Damp Grain Deterioration — The compounds 8-hydroxyquinoline and thiourea have been shown to be excellent inhibitors of respiration in damp wheat, declared Max Milner, Kansas Agricultural Experiment Station, while p-aminobenzoic acid also appears to be effective. Propylene oxide and carbon tetrachloride and thiourea were also found most effective in inhibiting other changes in damp wheat that would affect their commercial quality.

Flours milled from these wheats, however, even after 16 weeks of storage, showed undesirable gray crumb color and musty odor, regardless of treatment. All treatments, on the other hand, showed minor to considerable increases in specific volume of loaves, compared to those obtained from the damp untreated flours. A notable characteristic of the flours from all the damp samples was a marked decrease in response to the oxidizing improver, potassium bromate.

Part Played by Enzymes—Flours milled from sound wheat contain only traces of alpha-amylase, although they have ample beta-amylase, according to W. F. Geddes, U. of Minnesota. Yet an adequate level of alpha-amylase is essential in yeast-leavened products to insure sufficiently high rate of gas production, to provide residual sugar for development of crust color, and to produce bread of proper softness and good eating qualities. Therefore steps have been taken to supplement alpha-amylase content of flours. Since high alpha-amylase activity results in excessive liquefaction and dextrinization of starch during baking, producing bread with a moist dough-like crumb of poor eating quality, the addition must be made with care. This difficulty can be lessened by reducing the protease content of added malt.

Addition of oxidizing improvers such as chlorine dioxide, chlorites, bromates, iodates, or persulphates to dough made of strong, hard red winter wheat aid in obtaining best baking results. Attempts have been made to explain this action in terms of inhibition of proteinase activity but without conclusive evidence.

Lipoxidase was reported to accelerate the development of oxidative rancidity in fat and destroy the carotenoid pigments in bread and macaroni doughs.

Problems in Cake Baking—Control of uniformity was named as the greatest concern in cake production, by A. G. Hackett, Drake Bakeries, Inc. He listed nine specific problems which he said await solution by trained food technologists: (1) A process to eliminate the necessity of aging flour in the bakery; (2) a quick test (other than a baking test) to determine shortening performance—the results of which can easily be interpreted in terms of cake baking practice; (3) an economical and rapid method of thawing frozen eggs that will retain their functional properties and prevent an increase in bacteria; (4) better control of temperature for ingredient storage and production; (5) improved methods for mixing; (6) an improved staling inhibitor; (7) an effective mold inhibitor that will not affect the baking process or the odor and flavor of the baked product; (8) method of prevention of infestation and contamination of raw materials, particularly flour, during transit; and (9) a long range industry program for obtaining technically trained supervisors.

Starch Studies—H. A. Campbell, General Foods Corp., Hoboken, N. J., reported on studies of starches from corn, waxy corn, waxy sorghum, Java and Brazilian tapioca, made to determine effect of drying and processing conditions on their gelatinizing properties. Cold viscosity measurements, Brabender amylograph curves, enzyme reactivity, and photo-micrographs at different stages of swelling were used to show the differences in properties between the starches and effect of initial processing upon these varietal differences.

Brewers' Yeast In Foods—Elmer F. Glabe, Food Technology, Inc., Chicago, discussed the property of dried inactive brewers' yeast as a supplementary ingredient in bread, doughnuts, and corn sticks or chips, to prolong shelf life, accentuate flavor, and add nutritional value.

HOST CLUB MEMBERS RELAX. (L. to r.) John B. Rolle, Vegetable Juices, Inc.; Victor Conquest, Vincent J. Del Giudice, Jean N. Lesparre, Armour and Company.

PAST CHAIRMEN of Chicago Section. (L. to r.) M. E. Parker '43, R. V. Wilson '46, M. L. Laing '44, E. S. Stateler '48, C. L. Smith '49, G. V. Hallman '42.

Advances in Other Fields

Suspending Power of Carrageenin—Why carrageenin is exceptionally effective in stabilizing chocolate milk was discovered in a study reported by R. C. Rose and W. H. Cook, National Research Council, Ottawa.

It gels the milk protein by forming a casein-carrageenin complex, increasing the viscosity of the milk to a point where the cocoa does not settle. As little as 0.04 to 0.08 percent of carrageenin, based upon weight of milk, will stabilize the suspension. An excess of carrageenin (0.1 percent) precipitates the casein as curd. A small amount of salt reduces the viscosity considerably.

Since suspending power is a function of polymer size, there are some differences in carrageenins.

Shell Egg Thermostabilization—Stabilized by heating, shell eggs are more resistant to deteriorative changes commonly experienced during storage than oiled eggs. This is the conclusion of Harry E. Goresline, Research Div., Poultry Branch, USDA, after experiments with 400 cases of eggs treated in various ways, placed in storage and examined periodically over 8 months. Untreated and oiled eggs were used as controls. Eggs were heat-stabilized by exposing them to a flowing film of oil at 130 to 139 F. for 16 min. A temperature above 136 F. produced milky whites.

Candle grading and broken out appearance showed that the stabilized eggs retained their interior quality better throughout the 8-month storage period than did the oiled and untreated eggs. Loss of weight in storage was also less in the stabilized eggs. Whipping quality of the egg white was somewhat impaired.

Maintaining Free Sulphur Dioxide in Wine—An ingenious method of maintaining the free sulphur dioxide content of wine in shipment or storage, so as to prevent secondary fermentation, was described in a paper by H. Y. Yang and E. H. Wiegand, Oregon State College.

The trick is to seal potassium metabisulphite in a polyethylene bag and immerse it in the wines. The chemical gives off a small amount of fresh sulphur dioxide continuously due to volatilization, and this escapes through the gas-permeable, but moistureproof, bag into the wine.

Powder From Yeast Fermented Egg—Production of whole egg powder containing 2 percent moisture and stable in composition after two months storage at 100 deg. F. was announced by workers at Western Regional Research Laboratory, Albany, Calif. The powder was made from egg fermented with yeast to remove glucose content, spray dried, and packed under nitrogen. It was tested by a trained panel.

Yeast-Fermented Egg White In Cakes—Angel cake-making properties of yeast-fermented and dried egg albumen were reported by Frances Carlin and John Ayers, Iowa State College. This albumen was tested when fresh and after various periods of storage at 104 deg. F. Results indicate a slight decrease in beating rate and cake volume but superior to egg whites "spontaneously" fermented and dried. Conclusion is that controlled yeast fermentation to remove all of glucose content before drying gives an egg white with improved leavening power.

Antioxidants In Deep Fat Frying—The effect of adding an antioxidant to deep-fat fried potato chips, nuts, pork skins, and the like was reported by Louis Sair and Lloyd A. Hall, Griffith Laboratories, Chicago, Ill. Addition of the antioxidant salt was made to hot fried foods immediately after frying to retard rancidity development. In the case of some nuts, the antioxidant was added to the oil put on the cooked nuts for glazing purposes. This method of application seeks to offset destructive action of 325-425 deg. F. cooking temperatures on antioxidants added to the cooking fats and oils. No relation between carry-through of antioxidant in baked goods and resistance to oxidation in cooking oils was observed.

Fermenting Egg White With Streptococci—Pure-culture technic for fermenting egg whites prior to drying was reported by workers in the Microbiology Research Division, Agricultural Research Administration, Beltsville, Md. Several species of streptococci, including *Streptococcus lactis*, were used with fermentation from one to five hours at temperatures ranging from 70 deg. F. to 113 deg. F. No significant proteolysis or growth of contaminating organisms developed indicating that the objectionable characteristics of "spontaneously" fermented egg white is associated with growth of undesirable microorganisms. Also, the pure-culture fermented egg white was free from objectionable flavors and odors, had a pH ranging from 5.3 to 6.5, did not discolor at 248 deg. F. for 2 hr. and had excellent foaming properties. Solubility of the dried white in water was rapid. Industrial application of the process is being held in abeyance awaiting result of commercial evaluation studies under way.

SAMPLE PRODUCTS (l. to r.): Diced apples, sliced apples, whole prunes, apricot halves, whole apricots, whole grapes, sliced peaches, peach halves, banana slices.

PILOT EQUIPMENT, showing drum (left) which supplies hot oil for drying fresh fruit; vacuum chamber (center), with door open; and receptacle (arrow) that is filled with fruit and placed in vacuum chamber.

Dries, Puffs Fruits Quickly

Unit makes natural-color low-moisture fruit tidbits, tasty as snacks and suitable for baking. Process employs hot oil in chamber under vacuum

NUGGETS OF FRUIT with less than 2 percent moisture, and with colors approximating those of fresh fruits, have been rapidly produced in the single-stage evaporator pictured above.

Used is a heated vegetable oil of low vapor pressure, such as coconut, to contact the fresh fruit and evaporate the moisture. Vacuum of 2 to 0.2 in. Hg is maintained to remove vapors and produce a puffed product.

As a result of the removal of oxygen by evacuation, no enzymatic action occurs, and samples have been preserved for years without the use of sulphur dioxide.

Products manufactured include: Puffed banana slices, puffed Thompson seedless grapes, prunes, and apple slices. They are suitable for direct consumption and for use in baking.

The receptacle is filled with fruit to a depth of about 8 in. Then a screen cover is put on, the receptacle slid into the vacuum chamber, the chamber door sealed, and the pressure reduced to about 2 in. Hg. Hot vegetable oil, at 180 to 200 deg. F., is then sprayed over the fruit.

Water vapor evolves quickly, and its pressure while escaping holds the pores of the fruit in a puffed condition. To insure the rapid evaporation, pressure in the chamber must be continuously reduced to maintain it at a lower value than the pressure of vapor in the fruit. At the conclusion of the process, the pressure may be as low as 0.2 in. Hg, and the oil temperature as high as 220 deg. F. momentarily.

The fruit is now in a soft, puffed condition. To avoid its collapse when exposed to atmospheric pressure, the puffed fruit is cooled—and thus hardened—before the pressure in the chamber is increased.

Varying the Oil Content

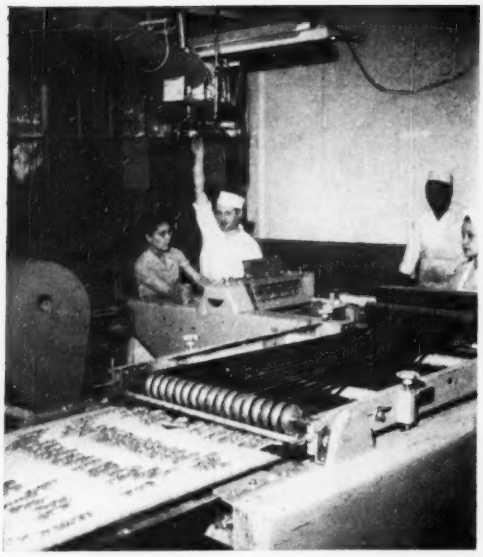
By utilizing appropriate procedures, oil content of the dried fruit can be controlled within selected limits. When a high content (50 to 60 percent) is desired, the cool oil bath is allowed to remain over the hardened, puffed fruit. Air is then let in to break the vacuum in the chamber, and the increased pressure drives oil into the pores of the fruit.

When a moderate oil content (15 to 25 percent) is desired, the oil is drained away from the fruit before the vacuum is broken. Then, when atmospheric pressure is applied, the small amount of oil clinging to the surface of the fruit is driven into the inner pores. This is aided by capillary attraction. When a minimum amount of oil is desired, a volatile solvent, such as dichlorodifluormethane (Freon 12) is used to extract the excess oil. By successive extractions the oil content can be reduced to 2 percent or less.

Skins of whole fruits such as prunes and grapes block entry of oil into the inner pores during the puffing and drying operation. Puffed whole prunes, without solvent extraction, come out of the drying stage with an oil content of 2 to 3 percent, most of which is clinging to the skin. By centrifuging at moderate accelerations, this can be reduced to below 1 percent.

Products that are being manufactured in the above pilot plant (located at the Vacuum Cooling Co., Salinas, Calif.) are being market tested for consumer acceptance by Vacu-Dry Co., Oakland. The process is patented by W. A. Webb, San Jose, Calif.

Acknowledgement: Much of the experimental work on this process was done with facilities supplied by Baker Food Products Co., Watsonville, Calif. Photos by Warren Pahlka.



SERIES of small belts, operated on pulleys, disperse and discharge bars onto conveyor feeding them to enrober.

COATING is automatically spread over bars as they pass through enrobing machine on their way to cooling tunnel.

Gets Bigger Output of Nickel Bars

Candy maker does it with advanced, high-speed automatic machines that enable him to increase efficiency and lower operating costs

J. T. RATCLIFFE
Factory Manager, Bishop and Co., Inc.
Los Angeles, Calif.

Confectioners are now in the same position as other manufacturers who have built their business on a nickel item. Caught in the squeeze between rising labor, material and equipment costs and the seemingly inflexible 5-c. price, candy manufacturers are bending every effort to reduce manufacturing costs through greater mechanization on their processing lines.

Bishop and Co., Inc., of Los Angeles, a subsidiary of the Water H. Johnson Co., of Chicago, has made two major strides in this direction: (1) Liquid ingredients, such as sweeteners and milk, are moved by pumps, wherever possible; and (2) processing lines have been streamlined to increase production and cut costs.

Although the plant produces a diverse line of candies, details on production of three items—the Powerhouse, fudge, and mint bars—will cover the story. First two bars are manufactured on separate floors. The mint-bar line, however, takes up four floors. Ingredients are cooked on the fifth floor and the remaining operations are carried out on the fourth, third, and second floors.

Making the Powerhouse Bar

A chocolate-coated triple layer of caramel, vanilla candy, and caramel-peanut mix comprises the Powerhouse. First, let us see how the line that makes it has been mechanized. Five hundred pound batches of ingredients for the three layers are cooked for about 15 min. at 240 deg. F. in steam-jacketed kettles. Two kettles are used alternately for each of the three layers. While a batch is cooked in one kettle, another is emptied from the second kettle onto water-cooled slabs. Three layers are poured one on top of the other. There are seven cooling slabs, each with overhead air ducts to draw off heat arising from the candy.

After the candy has cooled sufficiently, a heavy steel roller welds the layers together. Next, two operators make longitudinal cuts with a 32-gang circular blade knife through the top two layers and deeply score the bottom layer of carmel. Another man cuts the slab of candy into large rectangular pieces. And still another cuts it into smaller pieces—one half the width of the cooling slab. According to candy bar measure, each piece is 16 bars long and 4 wide.

These pieces are taken to the automatic cutting machines. There must be no delay at this point, since the candy hardens rapidly.

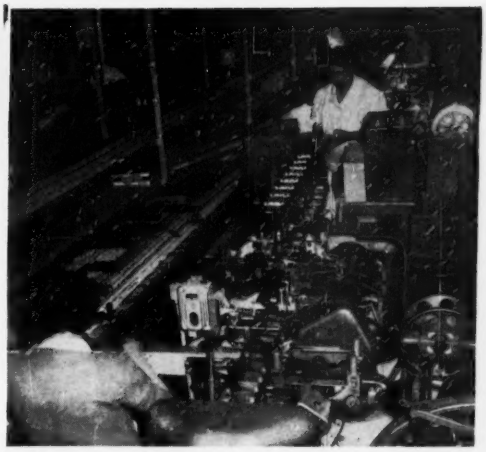
Cutting Slabs Into Bars

An operator now puts the 14-by-4 pieces through a machine that slits them into four rectangular pieces, each enough for 16 bars. This unit has five circular knives that cut and trim the edges of each piece into bar lengths. Sized pieces are then conveyed to a second machine where 18 circular knives cut them to the actual size of a candy bar. Capacity of these two cutting machines is 750 bars a minute.

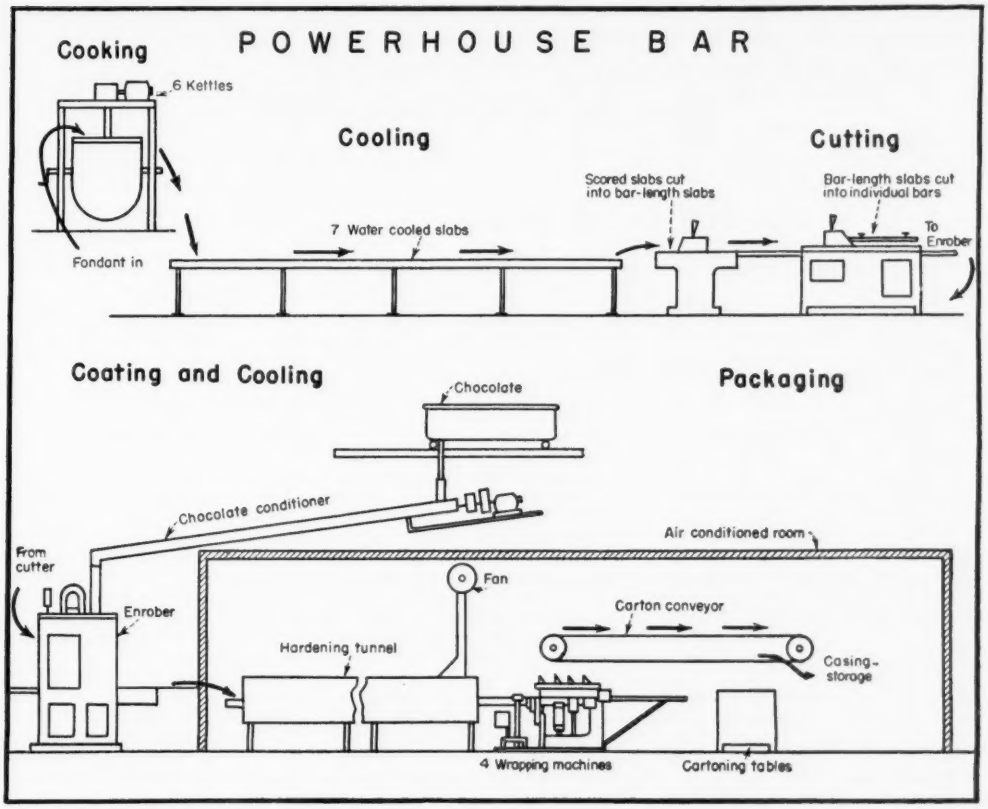
As bars leave the last cutter, they are carried by a series of small traveling belts that disperse and discharge them onto a regular belt conveyor going to the enrober. There are 16 of the small belts operating on pulleys

Improved Operations Point Up the Powerhouse Line

HIGH-SPEED CUTTER, with 18 circular knives, slices bar-width slabs into actual-size bars at a rate of 750 a min.



WRAPPING units cut bar-size cardboard liners, over which go printed waxed papers. Rate per machine: 120 bars a min.



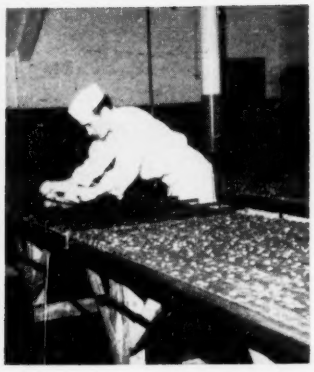
that, to diverge the bars, are more widely spaced at the discharge than receiving end. These belts are arranged in two sets, one above the other, and these candy bars move between them.

Coating is delivered to the enrober through a "conditioner" that maintains it at the proper temperature. As the bars emerge from the enrober, the coating is roughened by a blast of compressed air. Chocolate-coated bars then go to a 55 deg. F. cooling tunnel.

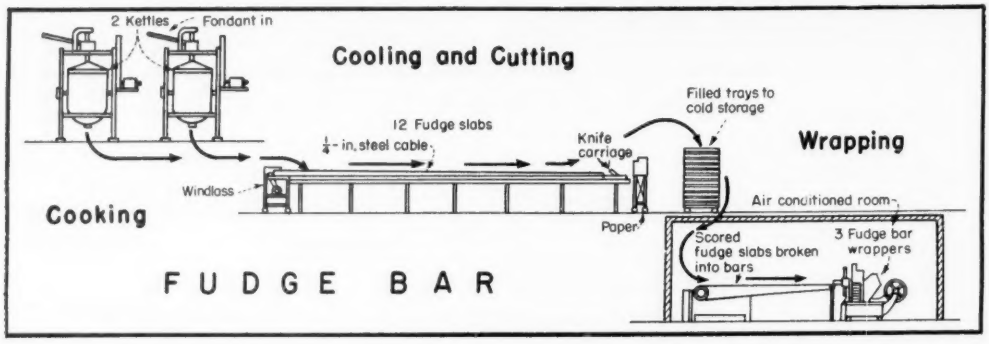
Quick 3-Step Picture and Diagram of Fudge-Bar Process

FIRST, fudge is emptied from pots and poured upon long cooling slabs.

NEXT, nuts are added and rolled into the fudge. Surface is roughened.



THEN, operator cuts slab into bar sizes with mobile cutting-carriage.



Packaging rooms are air conditioned. Temperatures are maintained at 68 deg. F. To provide proper air where needed, three complete air conditioning units have been installed on different floors.

A total of 480 bars a minute are wrapped by four machines. These cut bar-size cardboard liners—firm bases over which the printed, paraffined wrappers are applied.

Finally, the bars are conveyed to tables to be packed twelve to a carton. An overhead conveyor carries the cartons to a following station for casing —twelve cartons to a shipping case.

Six Tons of Fudge a Day

Next, the fudge-bar line: Daily capacity of this department is 6 tons of fudge (vanilla and chocolate). Here, every 15 min., one of the twelve cooling slabs is filled, while from another the cooled fudge is removed.

These slabs are not water-jacketed, since fudge hardens rapidly. Measuring 40 ft. x 32 in., the slabs are surfaced with short lengths of oak and maple to prevent buckling during cooling.

Two steam-jacketed kettles provide a steady supply of fudge. While one batch is cooking, the other is emptied and then reloaded. Each batch—including the Brazil nuts added to the fudge on the cooling slabs—weighs 400 lb.

Fudge is emptied from the kettles into pots and then poured upon cooling slabs that have iron retaining rods on all sides. Made the thickness of the fudge layer, these rods keep the candy from overflowing. The surface of each slab is covered with a waxed paper. Cooled fudge shatters easily and it must therefore be handled with care. Since the paper base has a thin film of oil, traying of this candy is facilitated.

In covering a slab, the operator unrolls paper to the full length of the table and then cuts the piece. The paper adheres to the surface, and the operator folds it against the angles formed by the retaining rods.

After the fudge has been poured on the slab and smoothed with a leveling device, 20 lb. of Brazil nuts are spread on top of the candy. As soon as the fudge has cooled so that it will not adhere to a wooden roller, the nuts are pressed into the candy. The surface of the fudge is then roughened with a spatula.

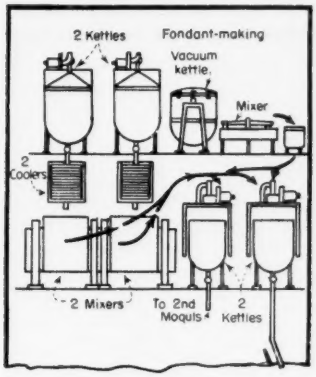
Novel Cutting Technic

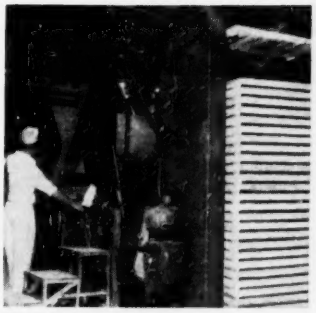
After the fudge has cooled sufficiently to be cut, the retaining bars are removed and a cutting-carriage is placed across a portion of the slab. This unit consists of a series of rails (four sets) over which rides a wheeled carriage bearing cutting blades. Beginning at one end of the slab, an operator pushes the mobile cutting carriage over the four sets of rails, one at a time. The rails are then moved to the adjoining section and cutting is repeated, this process continuing until the whole slab is cut.

Fudge is further cooled and hardened before the longitudinal cuts are made. By making the lengthwise-cuts too soon, the cross-cuts would "weld" together. Lengthwise-cuts are made in a single pass of another knife carriage.

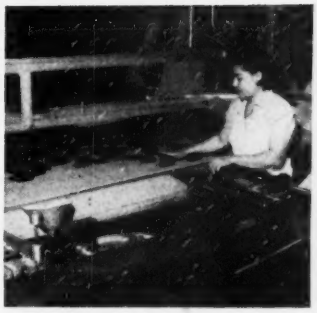
At this point, the fudge has hardened sufficiently for traying. Two operators now cut it into large rectangular pieces and slip a wedge between

Photo-Diagram Brief of Mint-Bar Making

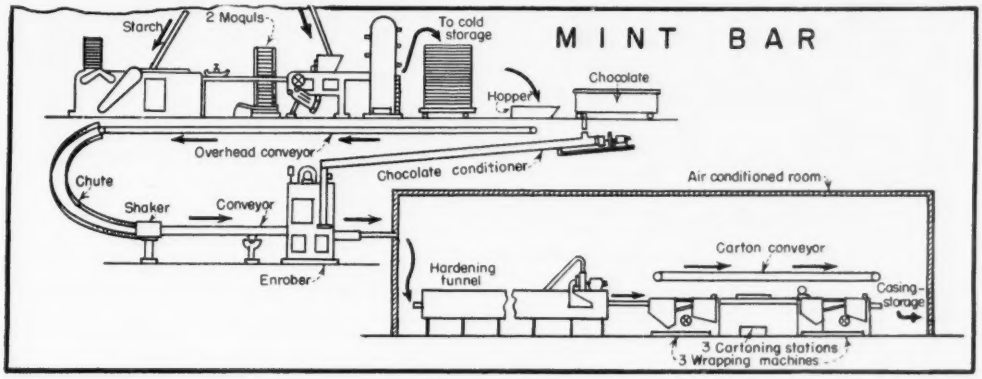




COMING from Mogul, trays of poured centers are stacked prior to enrobing.



COATED BARS leaving tunnel are fed to machine that wraps 120 a min.



the paper and the cooling slab. Next, they slide a wooden tray, the size of the large, rectangular piece, between the paper and the slab, lift the tray load of fudge onto a truck, and push it to the final cooling area. These trays have 3-in. spacer sticks on each end to facilitate stacking on the trucks that take the fudge into the storage area for 12 hr. holding at 80 deg. F.

The packaging room has a capacity of 4,500 cartons of 24 assorted (vanilla-chocolate) fudge bars per day. Each of the three wrapping machines handle 112 bars per minute.

Adjoining each machine is a break-up table. Here, operators peel the paper from the fudge slabs, and then stack the slabs so the wrapping machine operators can alternately feed six bars of chocolate fudge and six bars of vanilla fudge to a machine. Thus, the packer puts a uniform supply of both kinds of bars into cartons —twelve bars to a carton.

How Mint Bars Are Made

Now to the mint-bar line: Here, the start is on the fifth floor and the product moves by gravity to the floors below until it is finally wrapped and cartoned on the second floor.

On the fifth floor the mint centers are cooked to 240 deg. F. in two steam-jacketed kettles. Next, they flow through two water coolers and into dough-type mixers on the fourth floor. Centers are cooled to 120 deg. F. Then they go to two steam-jacketed re-melters and two bar-forming machines, located on the third floor.

These latter units require four operators. One feeds the machine with tray-loads of molded centers. Loading is carried out the preceding day, two operators "traying" the centers as they are conveyed from the bar-forming machine. The fourth operator runs the machine.

This unit automatically fills trays with a bed of starch and makes impressions in the starch the size and shape of the center.

Tray loads of centers are automatically dumped, starch is recovered for filling empty trays, and the centers are separated from the starch and conveyed to a traying station. Trays are about 3 in. deep.

Filled with starch and leveled, the trays then travel under the impression-plate, which gently presses into the starch, making 90 impressions. Before the plate leaves the starch, the tray is sharply tapped to free the molds and leave smooth impressions for the centers.

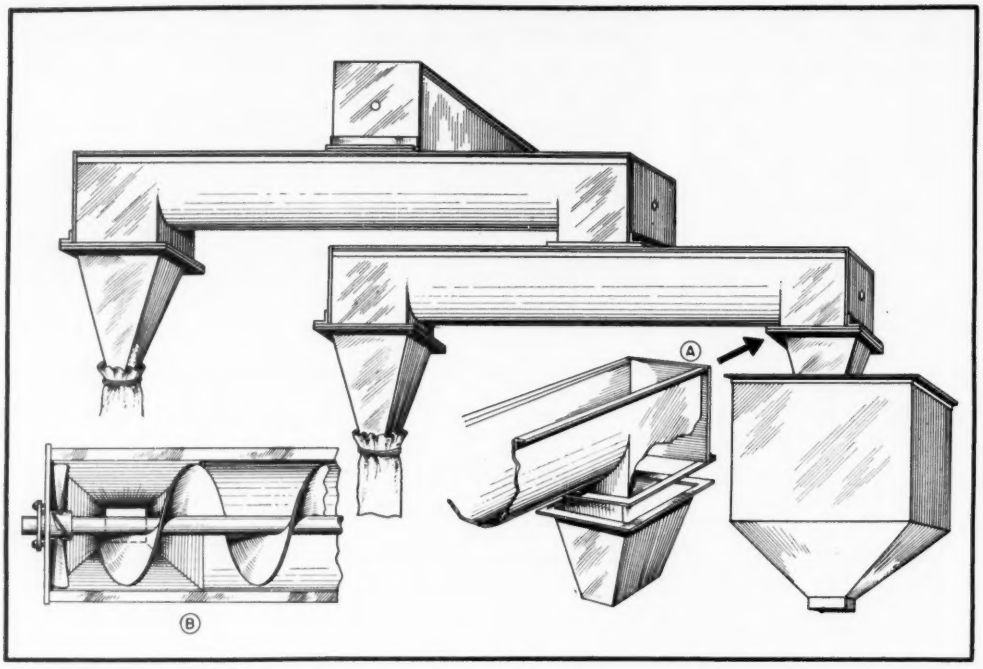
Depositing the Centers

Trays next go under multiple-filling nozzles, where they are automatically stopped at intervals, and the hot mint centers are extruded into the rows of impressions. Then trays travel to the exit end of the machines, where they are automatically stacked and finally trucked to the hardening room.

Hard mint centers made the previous day are manually dumped from trays into a hopper that empties them onto an overhead conveyor for transfer to the second floor. At the end of the conveyor, the centers drop into a chute that delivers them onto a shaker. Another conveyor feds them to the enrobers. Chocolate-coated bars then go to a 55 deg. F. cooling tunnel.

Mint bars are finally machine-wrapped at the rate of 120 a minute, packed 24 to the carton, and cased.

Layout for Flexible Flow and Efficient Discharge



COMPLETE DIVERTING is provided by this pattern. Feeding is at or near center of each additional reversing conveyor. Bottom delivery requires detailed plate designing (A). Discharge is improved (B) if paddle is installed at end.

Save *More* In "Moving Those Dries"

Production stoppages can be avoided, dust controlled, and flow accurately metered if dry materials are handled with screw conveyors used in unit way

W. A. REED
Plant Engineer,
Taylor Reed Co., Glenbrook, Conn.

CONCLUDING PART II

Flexibility of movement, continuous measured product flow, and control of dust can be obtained in the handling of dry bulk materials with screw conveyors used in the unit way. These conveyors are compact, individually operated machines so constructed that they can be readily moved.

The economics of these unit conveyors, also the operating details of bucket elevators, were covered in Part I of this article. Here, in the concluding Part II, are the working details on unit screw conveyors.

Two types of screw conveyors—the trough and tube—will satisfy most of the requirements of the small plant. They are similar in that the screw proper is the same in both and hence interchangeable, but they differ in performance. Each has its special place and function in a series of processing operations.

In the trough conveyor, there should be a minimum clearance (½-in. or less), between the screw flight and the semi-circular shaped bottom. The sides of the conveyor extend 1½-in. above the screw flight to a flat top. Space above the flight permits backflow, avoiding packing of material. Relatively little power is required. The trough conveyor will handle a greater volume than the tube type of the same diameter, however it functions best when only partly full.

Each advance of the flight in the trough conveyor pushes the material ahead. Any material adhering to the flight is usually wiped off by subsequent revolutions in the material. Since there is ample space all around the screw, friction is low and product packing negligible.

There are, however, several disadvantages of trough type conveyors. They are not satisfactory for elevating at angles of more than 15 deg. They bind when used for metering, unless altered to simulate a tube conveyor.* They will not move material from the bottom of a filled hopper. And they are unsuitable for discharging into the boot of a bucket elevator, unless considerable change is made in the conveyor design. We hasten to emphasize, however, that in those opera-

* A method of changing a trough conveyor so that it will meter has been described in the Practical Ideas department of FOOD INDUSTRIES—"Trough Conveyor Becomes Tube Type," p. 125, May 1950 FI.

tions for which they are specifically suited they are very efficient.

Flow Diverted

Conveyor screws are easily reversed to discharge from either end of the trough. The simplest application of reversing is diverting the flow of materials to another unit. In bagging, following a continuous process such as granulating, it is neither wise nor economical to interrupt the filling operation each time a bag is filled. And if a shut-off is used in a delivery duct, there is danger it may be left closed, jamming the system. A reversing conveyor that makes the bag filling continuous is faster, safer and more economical.

From each end of a reversing conveyor, ducts guide the material to scales. The ducts should be made of canvas to vent air pressure and they should be sloped at an angle of 70 deg. from the vertical. When the correct weight is reached in the bag on one scale, the conveyor is reversed to the second scale. As the second bag fills the first is removed and replaced by an empty.

The question may be raised as to why go to the trouble of using a conveyor when a vane valve might do as well. The answer is that an electric switch will reverse a conveyor. The installation of a vane valve which will operate as easily and have as complete cut-off as a reversing conveyor is very difficult to design and construct.

It may at times be desirable to divert a portion of the production to storage and fill the remainder into containers. This can be done effectively by adding a trough conveyor to one of the ends of the reversing conveyor, replacing one of the ducts. The duct is then attached to a discharge from this conveyor at the end nearest the reversing conveyor. The farthest end of the added conveyor discharges into the hopper.

When bagging, the added conveyor discharges into the duct. As each bag is filled the first conveyor is reversed to fill the other bag. There is no need to reverse the added conveyor during bagging, since its supply is cut off when the first conveyor is reversed. The added conveyor is, however, reversed to fill the hopper or bin.

By using more conveyors, this method can be used to guide materials to any number of process operations, bins or outlets. For best results, end discharge should be used. There is always carry-over from center discharges. By the time suitable gates are made and carry-over spillways constructed, more time and money will have been spent than is required for additional conveyors, which reverse with a switch, give complete shut-off, and do not require the designing of, or constant attention to, tight fitting doors.

The oldest form of continuous conveyor is one in which there is a straight line screw with hanger bearings every 10 ft. This type has wide application for handling coarse materials, such as peanuts, whole grains, salt, and similar products. For many other materials, this conveyor is less suitable. When sugars and powders are conveyed, the bearing clearance must be ¼-in. or more to prevent binding. Large bearing clearance reduces efficiency. Bearing wear is excessive, replacement is frequent and maintenance is high. If lubrication is adequate, some of the lubricant will overflow and contaminate the product. Sealed ball bearings, requiring no lubrication, can be used. But their large outside diameter reduces the space in which the material can flow, clogging the conveyor or reducing capacity. This type conveyor is therefore not recommended for food plants handling fine materials which can sift into bearings and cause them to bind.

How Long Runs Are Made

A good method of conveying some materials for a long distance is to stagger a number of trough conveyors so that they feed sidewise into each other. Two shafts drive this arrangement. One shaft extends through all the conveyors in one line, the second through all the conveyors in the other line. As the material progresses, it flows first to the right, then to the left. The disadvantage of this method is that some materials will jam when fed to the side.

A vertical overlap of trough conveyors is a much more efficient arrangement. This system works best in small plants where the distances for conveyor hauls is not too great. The initial cost is not prohibitive.

Standard 10-ft. sections of trough conveyors are used. Each conveyor is elevated enough to discharge into the top of the conveyor ahead. Thus, material drops from the upper end of one conveyor into the lower end of the next, until the distance is covered.

One motor will drive the entire battery of conveyors if small jack shafts are used at each overlap. The shafts, offset to the side, are at the same angle as the conveyors. The extended shaft of one conveyor drives the jack shaft through chain and sprocket. The other end of the jack shaft drives the next conveyor with mechanism similar to that by which it is driven.

These last systems may seem complicated to install and operate because of the use of many units. The first cost may seem to be high. Actually, it is relatively low. If a system is properly selected and well arranged in the beginning, total costs over a few years will be less. Such a system requires a minimum of maintenance or parts replacement and less labor. And, average production per hour is greater.

Conveyor Bearings and Drive

Bearings for screw conveyors should be of the same general design as those for bucket elevators (discussed previously in Part I). Replacement bearings should be designed and added to the conveyors. For the slight extra cost and almost unlimited life in service, ball bearings and outside packing glands are the wisest choice. Outside packing glands are necessary to prevent dusting at the conveyor ends where the sleeve bearings have been removed.

When replaced by ball bearings, an ideal arrangement is to extend an angle iron frame onto the drive end of the conveyor to carry the drive mechanism. The speed reducer shaft should be placed in line with the conveyor shaft and the two connected by a flexible coupling. This requires cutting two step-downs in the conveyor shaft diameter, one to provide a thrust shoulder to fit against the inside ball bearing race, the other beyond the bearing, turned to fit the flexible coupling.

A key slot is cut in the conveyor shaft where it fits into the flexible coupling and the key welded in place to the coupling. With this arrangement, the screw flight can readily be removed for adjustment or for cleaning. The conveyor end opposite the drive end is removed and the packing gland loosened. The screw will then slide free of the drive mechanism.

Motor sizes recommended for various sheaves and V-belt sections are given in V-belt handbooks. Pulleys selected for screw conveyor motor and gear reducer should be of ample size. For most screws of 9 in. dia., a ⅓ hp. motor has sufficient power when belted in a 1:1 ratio to a 20:1 gear reducer. The pulley should be of at least 4 in. dia., using an "A" section V-belt. This pulley is rated at 0.8 hp. and may seem oversize. But if this size is used the belt will not slip in case of a momentary jam.

If smaller pulleys are used, the belt will slip with every temporary jam so that the conveyor becomes more clogged and finally stalls. The length of the belts should also be increased when larger pulleys are used. Larger pulleys and longer belts will, in the end, save time and labor. Without slippage, a conveyor runs freely and uses less current.

The tube type conveyor requires

more power than the trough of the same length and diameter and is not easily cleaned without removing the screw. It is therefore used to best advantage in short sections. Tube conveyors will run either horizontally or vertically, but are not efficient at angles between 15 deg. and vertical. The bucket elevator is much better for vertical travel from a cleaning standpoint. Access doors can be built into the bucket elevator to make cleaning quick and easy.

A tube conveyor exerts considerable pressure when used as a valve, and therefore its performance is excellent as a metering device. One of the many advantages of using the tube for metering is that it does not permit dust blowback when connected to a bucket elevator or other dust breathing device. However, since the internal friction is high, the tube conveyor is not efficient with non-free-flowing materials.

Metered Flow Is Dependable

For an operation such as milling, it is frequently necessary to feed materials at a uniform rate, often at a very slow rate. Take a case where a machine is hand fed and the required rate is slower than an operator would normally feed. Perhaps "off rhythm" the operator feeds even more intermittently. Installation of a large hopper feeding into a tube conveyor overcomes this difficulty.

This type conveyor does not fail because of pressure at the feed, but rather works better under pressure. The metering will be dependable, and since the hopper will require filling only at intervals, labor saving will result. Also, the quality of the milled product will improve because the feed to the mill is accurate and constant.

If, for processes such as milling, a constant flow of material is required, and if there are one or more conveyors ahead of the mill, it is only necessary to feed the first conveyor at a constant rate using a tube conveyor for the metering. Although conveyors that follow must have a greater capacity than the metering conveyor, they cannot of course, deliver more than they receive. Even when the loadings are light in order to deliver ingredients in dribbles, the rate of feed to the processing operation is still accurate and constant.

A 6-in. tube conveyor delivers about 100 lb. per hr. per rpm. If the conveyor rotates five times per minute, it will deliver 500 lb. per hr. While this figure is not exact for every material, it does give an idea of the speed ranges to pick from when making a new installation.

When a tube conveyor is used for metering, it should have a variable speed drive. There are times, due to variations in the product, when the rate should be stepped up or reduced. There are many variable speed devices on the market.

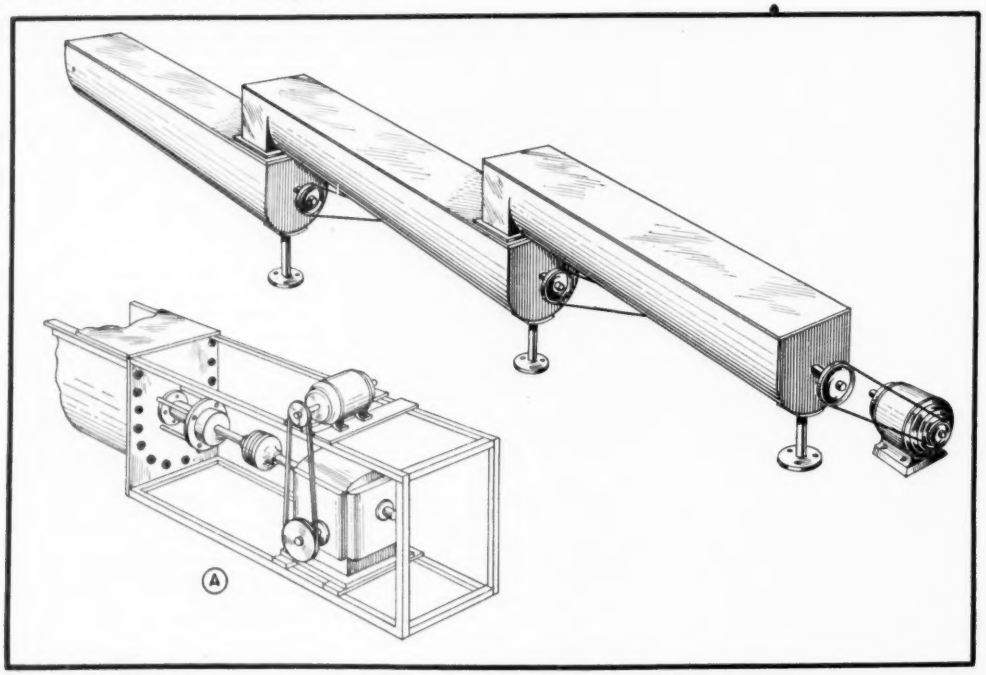
If a low cost speed regulator is chosen, it can only be used where the torque is low, and must therefore be placed between the drive motor and the gear reducer. The reducer should have a ratio of 40:1.

The least expensive method of obtaining variable speed is to have matching sets of pulleys with varying sheave diameters mounted in reverse on the motor shaft and the gear reducer shaft. When V-belts are shifted from one combination of sheaves to another, the speed is varied.

This arrangement, however, requires considerable time for adjustment. Since the belt guard must be removed and replaced, there is some accident hazard. For small conveyors, the compound V-belt type is best. It is low in cost, produces a relatively constant speed, once it is set, and has a wide range of adjustments.

Another valuable use of tube conveyors is feeding ribbon mixers from

Units In Tandem for Long Runs



TROUGH CONVEYORS in line, each elevated to discharge by gravity into succeeding unit, can be used for extended conveying. One motor will drive assembly if jack shafts are used between units. An improved end drive is shown (A).

bins. For best results, the mixer should be running when the conveyor is feeding. In this arrangement, the materials are weighed and dumped into bins at convenient height.

If the mixer is set so high that dumping into it from the conveyor is difficult, the infeed should then be attached to the mixer bottom at the end opposite from the discharge. Ribbon mixers often are elevated from the floor in order that they may discharge into barrels. But this is an inconvenient arrangement, because ingredients have to be elevated to be emptied into the mixers.

When fine powders are processed, the gate or discharge door of the mixer will leak, causing heavy dusting. Best solution to a leaking mixer discharge is to replace it with a pressure type tube conveyor. No material or dust can escape from the tube conveyor when it is stopped. Dust from the conveyor discharge is controlled by a canvas duct or hood over the barrel.

If the proper size conveyor is selected, it will empty the mixer as fast as barrels can be placed under the discharge end. If the mixer is lowered for greater convenience in adding ingredients, the tube conveyor can be set to discharge upward into a trough conveyor set at an angle up to 15 deg. The trough conveyor then discharges into the barrels. It is much more convenient to add ingredients, also to inspect the operation, when the mixer is near floor level. The conveyors provide a more efficient method of filling the barrels.

When feeding from a mixer to a mill via conveyor, a variable-speed drive should be employed to control the speed of the conveyor so that the discharge to the mill may be varied. It is advantageous when two mixers are used to feed the mill. One discharges to the mill as the other processes. When two mixers are employed, the mill does not have to run empty or be stopped on completion of the mixing operation.

An installation to achieve sufficient mixer and conveyor capacity can greatly increase the out-put of the mill. Sometimes it is more economical to use a mixer as a part time storage bin than to construct a separate hopper. Discharge from a mixer is certain, and there will be no partial separation of light and heavy materials in bin or chute.

Jams in bins and hoppers are to be expected. It is generally necessary to use vibrators or other devices to maintain a flow from them. With certain kinds of materials, jams will occur whether the material leaves the bin by chute or conveyor, unless precautions are taken. Vibrators are a help.

Blowing nitrogen into the bottom of a hopper will loosen a jam. Rotating paddles or mechanical mixers are used with varying success. The crude method is to have a man punch through the material with a pole. If a pole must be used, it should be suspended from its upper end by a wire so that the lower end cannot injure the flights of the screw.

Tube Used for Pressure Feeding

Because tube conveyors exert considerable pressure, they will feed into the bottom of bucket elevators or any other device when bottom or pressure feeding is desired. If unusual power is required when a tube conveyor is feeding a bucket elevator, it is ordinarily due to one of two things, or both.

First, if there is no baffle to carry the material from the buckets as they discharge at the top of the elevator, a portion of the product will be returned to the boot of the conveyor causing overloading. Second, piling of material in the boot also occurs when the elevator is running too slowly.

Either of these causes will put back pressure on the feed conveyor. When design and speed of the assembly are right, performance is smooth and efficient.

The bearings, glands and drive arrangement should be changed on tube conveyors the same as on trough conveyors. The improvement in performance will be just as great. Cleaning a tube conveyor, however, is much more of a problem than cleaning a trough conveyor. If a tube conveyor is 6 ft. long, it is often necessary to use a chain hoist to remove the screw flight. For this reason, if the material travel is any appreciable distance, a short tube conveyor feeding a trough conveyor should be used instead of a long tube conveyor.

Tramp Iron Removed

Whether or not the dry materials handled in a plant present an explosion hazard, magnetic separators are an asset. They protect expensive machinery against damage from tramp iron, avoiding unnecessary repairs and shut down. If dust from the processed material may become explosive, magnetic separators are a "must". A magnetic separator placed ahead of a milling operation prevents tramp from entering and damaging the blades of the mill. Sparks from the tramp could cause an explosion. There are two efficient types of magnetic equipment for removing tramp iron from ducts—the rotary or drum type, and the throat type. In both, the magnets are stationary.

The rotary device consists of a power driven stainless steel drum which turns about a stationary shaft, to which the permanent magnets are attached. The magnets are on the side of the shaft facing the flow of the material. Any magnetic substance in the material is held onto the face of the drum. The material flows over the cylinder into a receiving duct. The magnets hold the tramp on the drum. When out of the field of the magnets, the tramp falls into a separate chute and is collected. One disadvantage of this device is that fine sugars and similar adhering substances cling to the drum and spill into the tramp iron bin to become waste.

In the other device, the magnets are placed on the under side of a rectangular chute inclined at 70 deg. from the vertical. They are mounted on the outside of a tight fitting door, which is opened at intervals for inspection and removal of tramp. There is no place for the product to escape with this arrangement, hence no loss results. If a plant is well engineered and carefully operated, very little tramp should find its way into the system. Nevertheless, there is no excuse for not exercising every precaution.

Explosive Hazards Curbed

Sugar, starch, and many other food dusts are explosive when suspended in air. Compared to some explosive materials, their ultimate pressures are not excessively high (75 lb.). But they do explode. If there is ample explosion venting, the possibility of trouble is greatly reduced. Mills are the greatest hazard, and must have explosion venting before they can be placed in service.

The dust removal system is the next in line as a hazard, since its drags air and dust from all over the plant. A spark or fire can readily find its way to this unit, and with its high concentration of dust in air, it may blow up. All mixers, elevators, and bins are explosion hazards. They should be adequately vented, too.

Considerable air is drawn into the system and is entrained in the products. The air will escape somewhere, carrying dust with it unless precautions are taken. Black furnace cement adheres well to steel surfaces and effectively closes all holes and cracks. But, even though the system is made tighter, air under pressure, carrying product with it, will escape. If no where else, through the explosion vents.

The usual method of preventing dust escape and product loss through explosion vents is to place light sheets of metal seated on rubber gaskets over the vent openings at the base of the vents. In the event of an explosion, these are blown out of the vents.

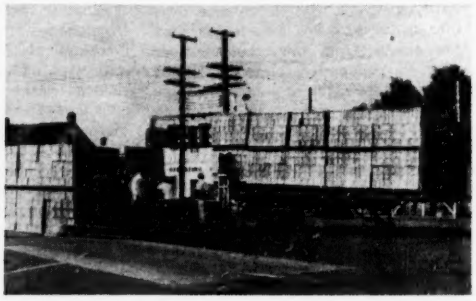
(*Turn to page* 168)

Camera-Trip With Cases Reveals New Efficiency ⟶

1 AT DISTRIBUTION CENTER, cases coming off conveyor are pallet stacked. Manual effort is minimized.

2 UP THEY GO, two pallet loads at a time, into well-defined rows. Floor guidelines direct operator.

5 HAND TRUCK in trailer simplifies moving outgoing loads for manual stacking—frees lift truck fast.



6 EMPTIES come in on trailers from can and bottle suppliers, are unloaded quickly and easily.

Get Better Warehousing for Your $

Ritter has done it with a new layout keyed to the lift truck—a combination that's clipped man-hours 75 percent, curbed case damage, and upped capacity

IVAN C. MILLER
Editorial Consultant, "Food Industries"

Through use of industrial lift trucks and palletizing, the maximum warehouse space can be utilized, damage to cases minimized through better stacking, and handling time and labor per case reduced—as demonstrated at the plant of P. J. Ritter Co., Bridgeton, N. J. And with these benefits, the daily capacity of the warehouse operation is increased.

With the company's plant production considerably greater today, approximately one-fourth the number of warehouse employees are required, as compared with labor requirements under the old system.

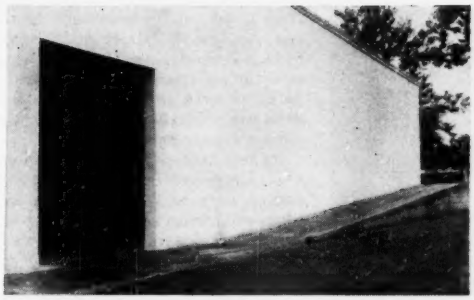
Since the cost of handling and warehousing food products, from the time they leave the production line in cases until they are in the railroad cars or trucks, is often a sizable amount of the total cost of production, improvements in warehousing methods can effect real savings. And this is especially true in the canning industry, where frequent large inventories are warehoused at the plants. The advances in warehouse design and methods at Ritter's provide an excellent example of the extent to which these costs can be reduced.

Tracing the Operation

Labeled finished products leave the case sealers and travel the length of one warehouse, by a combination of conveyors, to a distribution terminal, where they are taken from the conveyor by hand and stacked on pallets. Lift trucks transport the palletized stacks to the new warehouse or to those sections of the older buildings which permit pallet stacking. Ninety percent of the present warehouse capacity is suitable for stacking of palletized cases.

The new warehouse was built for the storage of labeled finished products sealed in cases, ready for shipping, and palletized for lift truck handling. In designing the structure, the height was established for stacking of four or five pallet loads (depending on the size of the cases) with a minimum of waste space above the stacked cases. Steel columns, forming the bays, are spaced for a uniform number of palleted stacks in each bay with a minimum of excess space. Stripes are painted on the floor to pilot the lift truck operator in stacking to a planned pattern.

Grade of the ramp to the loading platform is gentle enough to be easily



3 **OUTGOING** loads are sped up this gentle-slope ramp. Note clean, unencumbered lines of warehouse.

4 **SAW-TOOTH** shipping platform establishes definite truck stations, brings top work-area efficiency.

7 **INSULATED** swinging doors to refrigerated rooms permit truck to enter without driver dismounting.

8 **IN COLD STORAGE,** perishable fruits and vegetables, also sugar and salt, are efficiently palletized.

climbed by loaded trucks. This ramp, on the outside of the warehouse, is the only lift truck approach to the loading platform. Location of the ramp outside increased the available warehouse space and now lessens the traffic congestion on the inside.

The loading platform, of saw tooth construction, accommodates eight truck trailers. Palletized cases brought from the warehouse on lift trucks are transferred to a hand truck just inside the trailer. Two men unload the cases from the hand truck and stack them inside the trailer. One lift truck, transporting palletized loads of cases from the warehouse, can meet loading requirements of the eight trailers.

When the previous method was in use it was possible to load-out 10,000 to 11,000 cases per day. Now, through the use of the industrial lift trucks, palletizing, and improved building design, 50,000 cases can be handled per day. In the old way, a warehouse of 150,000-case capacity required more than three days to fill using a stacking elevator and 15 to 16 hand stackers. An equal length of time was required to empty it. But now, less than three days are needed for one lift truck to fill or empty the 150,000 case warehouse. And with the help of two warehouse men, the outgoing cases can be loaded onto trailers at the same time.

A portion of the pack from the production lines goes unlabeled into unsealed cases, then by-passes the case sealers and is hand-loaded directly from the lines onto pallets. The time necessary for the lift truck to transport the filled pallet to the warehouse, stack into position, and return for another load, is less than the time used loading the cases on the pallet. Another economy: Between trips to the warehouse with filled cases, the trucks sandwich in many odd jobs of lifting, shifting and transporting.

Cases of empty cans and glass jars are brought to the plant palletized. Only a few minutes are needed to unload a trailer load of cases of empties, removing them two pallet loads at a time.

Some of the raw material from the farms comes to the plant palletized by the farmers—asparagus in lug boxes, sweet red peppers, and others. Unloading these products by lift truck greatly reduces the hand labor, speeds unloading, reduces congestion in the yards, and hastens the farmers' return for additional loads. Other raw materials, such as salt, sugar, flavorings and seasonings, are also palleted for storage and transportation about the plant, as needed.

Cooling Facilities

Built into the newest warehouse is a two-room cold storage department—making a two-temperature warehouse. Here, meat for pet food, bacon trimmings and side pork for baked pork and beans, onions, and seasoning are stored. This cold storage accommodation is also used to collect and store the pre-season loads of fruits and vegetables until the volume is sufficient to start processing. It provides storage, too, for perishables that accumulate during peak operations.

Movement of products in and out of this cooling warehouse is by lift truck. Rarely is auxiliary labor required. Entrance to each cold storage room is through Jamison double doors. The heavily insulated outer doors are opened by hand, while the inner insulated doors allow the lift truck driver to push through without dismounting and the doors swing closed when truck and load have cleared. Labor requirements and temperature losses are thus minimized.

Overhead Unit Compact, Efficient

DETACHABLE hangers—for easy removal—secure two-block bunker mounted at upper left on this small truck. Refrigeration is quite adequate for purpose.

Dry Ice Bunkers Fan-Cool Trucks

Light aluminum units economize on refrigerant and "easy" is word for installation and maintenance

FOOD FLEET and individual owners who use dry ice to refrigerate their truck and trailer loads will find that bunkers will save up to 25 percent of the refrigerant as compared with carrying the dry ice in corrugated cartons on the top of the load.

To save shippers the laborious task of constructing homemade dry ice bunkers or compartments, Foster-Built Bunkers, Inc., of Chicago, has recently placed on the market a light-weight aluminum bunker. In units of one or more, these can serve any size of truck and trailer body. Combined with a small electric fan to circulate the air over the dry ice, they also provide a positive temperature control.

Also, these bunkers are portable—meaning they are supported on detachable hangers, which can be removed to take out the bunkers when refrigeration is not needed.

There are four types of automotive refrigeration now in common use, namely: Mechanical methyl chloride or similar units, cold hold plates, water ice, and dry ice. Specifically our purpose here is to indicate how to get the most out of the last.

However, it is not amiss to outline the individual spheres in which the four different refrigerants perform their work and to point out some of the advantages of dry ice when used in conjunction with the bunkers described here. Water ice is adequate for temperatures of from 50 to 60 deg. F. for the refrigeration of eggs, fresh fruits and vegetables, cheese, and the like. But it is not suitable for the lower temperatures—down to zero for ice cream and quick frozen foods, or even for the medium temperatures required for fresh meats and certain specific vegetables.

On long haul, city-to-city operations over diverse routes where all loads carried have to be refrigerated and where no intermediate plant refrigeration aids or dry ice supplies are available, the self-contained mechanical units provide adequate refrigeration and temperature control. Some food processors, such as ice cream companies and meat packers, who have their own cold storage boxes refrigerated on the ammonia system, have found cold hold truck plates adequate on relatively short distribution routes, with the plates recharged at the home plant at night.

Dry Ice Advantages

Where dry ice is readily available, it may be used to provide refrigeration in the low temperature ranges. Dry ice comes in standard 10 x 10 x 10 in. blocks weighing 50 lb. each. The approximate cost of dry ice on the general average throughout the United States is $.75 per 50-lb. block.

Two of the principal advantages of dry ice are its light weight and the flexibility of its use. A prime aspect, as regards lightness, is the fact that there is no need for mechanical equipment, such as a separate gasoline power source, compressor and other fittings. Hence, too, there is no need for servicing. With the dry ice carried in corrugated cartons on top of the load, the cartons will eventually become empty when all of the dry ice block has changed from a solid to a gaseous state. In short, the weight keeps going down, thus heavier payloads may be carried.

Dry ice's flexibility derives from its convenience in meeting requirements. It may be employed to refrigerate either all or just part of the load, as conditions may necessitate. If an insulated truck or trailer is carrying a food load that has to be refrigerated in hot summer weather, sufficient dry ice is added to do an adequate job. But the same load in cold winter weather may require no refrigeration at all and no dry ice need be added.

While the practice of merely adding blocks of dry ice in corrugated cartons on top of the load is a simple and easy way of providing low temperature, there are encountered the problems of interior contents' temperatures being spotty, too low at some points, and too high at others, with

no positive control. It was to overcome these difficulties and to get a lesser amount of dry ice to provide the same degree of refrigeration that the Foster-Built bunker was developed.

Comes in Two Sizes

It is made in two sizes, one for two 50-lb. blocks of dry ice and one for four blocks or 200 lb. In form, the bunker is a rectangular aluminum box with a small Siroceo fan at one end. In cross-section, each box is 10 in. wide and 12 in. deep with a false bottom 2 in. above the real bottom.

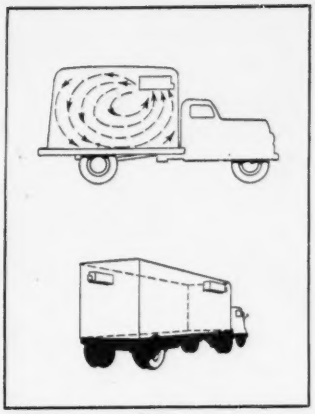
The blocks of dry ice are inserted through a hinged door (at the end opposite to that at which the fan is located) and rest on the top of the false bottom. The fan forces air through the duct formed between the false bottom and the real bottom and circulates it throughout the body.

Since the dry ice rests on the top of the false bottom plate, the air that contacts the bottom of this plate picks up the cold of the dry ice while it is passing through the duct and before it is circulated through the body. It is this positive circulation of the cold air that is the secret of the greater utilization of the dry ice as a refrigerant.

The two-block bunker weighs only 38 lb. net. The four-block bunker, which has the same cross-section but is twice as long, weighs 70 lb. The fan is of the low-amperage type operated from the vehicle storage battery.

Time Range Noted

On retail route trucks, one of either the two-block or four-block bunkers is adequate, depending upon the temperatures desired. These bunkers have operated for as many as 18 hr. without re-icing, despite as many as 30 to 40 door openings.



CIRCULATION of cold air is aided by fans in both trucks and trailers.

One Unit for 10 Feet

In trailers, the four-block bunker is usually used, with one unit for every 10 ft. of trailer length. Thus, in a 21-ft. trailer, two are used—one in the front blowing toward the rear and the second in the opposite rear corner blowing forward. In 30-ft. trailers, three bunkers are employed, one in the front blowing to the rear the second at midlength of the body, and the third at the rear. The latter two blow toward the front.

As evidence of dry ice savings secured through the use of these bunkers, the results of two tests may be cited. In the first trial, two identical 32-ft. trailers were loaded with 30,000 lb. of butter in Chicago and driven overland to Boston. They traveled together, and due to delays en route were under refrigeration for 94 hr. Each load was precooled to 45 deg. F.

Trailer A was equipped with bunkers and used 1,200 lb. of dry ice. At unloading, the butter it carried was at 44 deg. F. This was 1 deg. lower than when initially loaded.

Trailer B, without bunkers, was initially iced with 1,050 lb. of dry ice in 21 cartons placed on top of the load. En route, 600 lb. additional were added to give a total of 1,650 lb. for the trip, an excess of 450 lb. or approximately 25 percent more than with the fan-circulating bunker-equipped Trailer A.

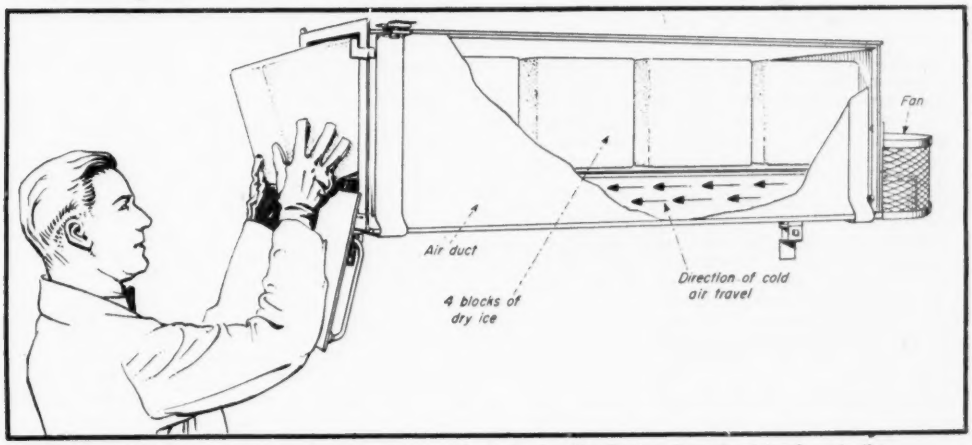
Even Temperatures

At unloading, the butter in Trailer B was at 45 deg. F., the same as at loading, but 1 deg. higher than Trailer A with the bunkers. In a spotcheck, Trailer A's load showed a more even distribution of temperature upon arrival and also a drier load.

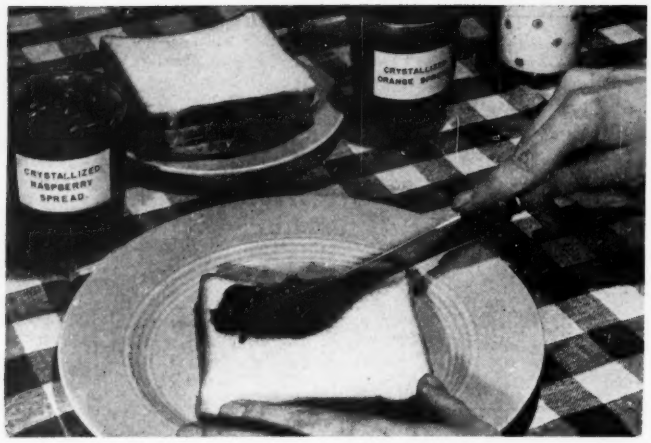
In the second test, a 28-ft. trailer at Milwaukee was loaded with 21,000 lb. of frozen strawberries at 11 deg. F. for shipment over a 300-mi. route to Indianapolis. The trailer was iced with 300 lb. of dry ice in three bunkers.

Upon arrival at destination 20 hr. later, the load temperature was checked at ½ deg. F. below zero, and there were still 70 lb. of dry ice left in the bunkers. With a net consumption of 230 lb., this showed the ability of the dry ice bunkers to maintain (or in this case to reduce) the load temperature en route in low-temperature ranges.

Gives Fan Space to "Push" Cold Air Out



FALSE-BOTTOM duct of aluminum bunker gathers cold air for fan distribution throughout truck or trailer.



SMOOTH SPREAD is made without pectin, has fine texture and fruit flavor.

New Crystallized Fruit Spread Shows Commercial Promise

Rated high in flavor, ERRL product combines fruit and honey. Mix is vacuum-cooked to 83 percent solids. Fine-grain crystallization follows

JONATHAN W. WHITE, JR.
Eastern Regional Research Laboratory, Bureau of Agricultural & Industrial Chemistry, Agricultural Research Administration, USDA, Philadelphia

A new fruit product—a smooth spread whose excellent texture is contributed by fine-grained crystallization of dextrose—has recently been developed at this laboratory. Used in the same way as jams and preserves, it serves as a delightful spread for bread, toast, or crackers.

The new product has an excellent fruit flavor. Its solids content and energy value are higher than jams and jellies, and it does not depend on the conventional pectin gelation for its properties. Moreover, its acid content may be controlled for optimum flavor, since the texture is not influenced by the acidity.

Fruit juice (or puree) and honey are first mixed then finished in vacuum to about 83 percent solids. Next, the mix is subjected to a controlled fine-grained crystallization to produce a smooth, nonstieky consistency. Such crystallization is the basis for the natural-honey product known as honey-spread, creamed honey, or Dyce-processed honey[1].

Fine texture of the new product is brought about by dextrose hydrate crystallization in the presence of a relatively large amount of levulose, which prevents a hard, solid crystallization.

During studies on the utilization of dark, strong-flavored honeys, a deflavoring and decoloring process was developed[2] that produced a bland, high-levulose syrup in which the natural honey sugars were retained substantially in their original proportion. Invert sugar—equal parts of dextrose and levulose—also crystallizes under the specified conditions. But crystallization is too extensive, producing a hard mass that cannot be spread. Hence, the sugar component for the product must be either natural or deflavored honey.

The latter is recommended, since it affords a uniform, flavorless raw material that does not mask the fruit flavor. However, a pleasing fruit-and-honey flavored product is made with natural good flavored honey and a reduced amount of the fruit component.

Various surplus fruits, purees, or by-product juices may be converted into the crystallized spreads.

What Fruits Were Used

We have prepared fruit spreads with excellent consisteney and flavor by using a de-flavored buckwheat honey and the following fruit materials: (1) purees of frozen strawberry and red raspberry: (2) "juice" from frozen strawberries and red raspberries; (3) fresh peach puree; (4) commercial bottled grape juice; (5) commercial canned pineapple juice, loganberry juice, peach "nectar," apricot "nectar," Montmorency cherries (puree); (6) an experimental pack of grape juice concentrate with essence*; and (7) commercial frozen orange juice concentrate.

An excellent spread resulted when one part of the de-flavored honey was used with one part of juice or puree. Crystallized spreads made from red raspberry, grape, loganberry and orange are especially pleasing in flavor.

The products are stable and self-sterile at ordinary temperatures. But they deteriorate when stored for some time at temperatures above 90 deg. F. Reason: High temperature storage brings about a reversion of the crystallization, resulting in a product with an undesirable texture.

Fruits generally contain dextrose, levulose, and sucrose sugars. And in several cases, the amount of levulose equals or exceeds the dextrose content.[3] Some sucrose (up to at least 8 percent of the weight of the honey) has little if any effect on the texture of the spread. On the other hand, excessive dextrose from a fruit could lower the levulose-dextrose ratio to unity or below, resulting in a too-firm texture. Such a product may possess a good texture after crystallization. But on storage, further crystallization takes place, resulting in a firmer product.

Since vacuum concentration is a step in the process, it would be highly desirable to return the volatile flavoring constituents ("essence") to the

(*Turn to page* 166)

* Prepared by R. P. Homiller and N. H. Eisenhardt of the Chemical Engineering & Development Div. of our laboratory.

Shortcut to Solids

TABLE—CONVERSION of Degrees Brix (Determined by Refractometer) to Percent Solids in Spread*

Degrees Brix	Equivalent Solids Percent
78.0	79.2
79.0	80.3
80.0	81.4
81.0	82.5
82.0	83.6
83.0	84.7
84.0	85.8

* Calculated from published data on honey[2] and sucrose[3].

We Think . . .

■ California Makes Enlightened Approach to Pollution Control

California has come up with a common-sense approach to water pollution control which merits careful consideration. It is of particular interest to food processors, as it could ease waste disposal problems in many instances.

Several states have established pollution-control programs on a basis of planned zoning of streams according to major uses and abuses of water. And although California has three fairly well defined zones, the state's Water Pollution Control Board does not consider zoning the best approach to pollution control.

True, that method of regulation lets waste-producing agencies know where they stand, and it is a simple basis for administering a control program. But it has these shortcomings:

1. The uses of waters within a zone are by no means uniform throughout the zone.

2. The effects of pollution are not dispersed uniformly throughout a zone.

3. The zone plan does not properly recognize that the need for economical waste disposal is just as exacting as the need for protection of water quality for beneficial uses.

4. A zoning program tends to be fixed and does not lend itself to a program of reclaiming lost water or upgrading a degraded area.

In view of those faults, the California water experts advocate a pollution-control program which takes into account the following key factors:

1. The total interest in a control scheme involves economical waste disposal as well as preservation of beneficial uses of water.

2. Requirements as to waste disposal must recognize the area of influence of waste with respect to bacterial, physical and chemical effects and be only sufficiently severe to protect some beneficial water uses.

3. Account must be taken of the present and future planned quality of a receiving water.

4. Requirements must be reached by logical analysis of the pertinent factors.

5. "Pollution" should be restricted to impairment of water quality which unreasonably affects such waters for beneficial use.

6. Account must be taken of the fact that ground waters are of paramount importance and that damage to them is long-lasting, whereas surface waters recover quickly when the source of contamination is removed.

With these major considerations as a basis, the California Water Pollution Control Board proposes a systematic analysis of waste disposal problems, this to be used in arriving at appropriate requirements. The restrictions would be no more severe than necessary, and they would be based upon comprehensive technical, economic and social-benefit data.

Properly administered, such a control program should be fair to all concerned. And it should protect the public interest, both present and future, without imposing unnecessary burdens on processors and municipalities.

Incidentally, complete details on the proposed California control program can be obtained from the State Water Pollution Control Board, State Office Bldg. No. 1, Sacramento, Calif.

■ Railroads Take Plausible Step to Reduce Shipping Damage

Association of American Railroads has made a move which not only will help the carriers but will benefit food processors and distributors in more ways than one.

AAR has hired a canned food specialist, Eugene J. Kraska, to investigate the causes of damages to canned goods in shipment and to suggest preventive measures. With his knowledge of canned foods—and he has his own laboratory—Mr. Kraska undoubtedly will come up with constructive proposals. These will enable the railroads and food processors to reduce the damage to canned foods. Certainly this needs to be done, what with the losses totaling $7,728,327 in 1948. This was an increase of 20.4 percent over 1947, and the loss went still higher in 1949.

As part of his work, Mr. Kraska will assist railroad inspectors in the performance of their duties, and will be available for consultation at points where canned foods are received in volume. He also will cooperate with can manufacturers and trade associations, and in some cases will even visit canneries and suggest practices which will reduce the denting of cans and improve casing technics and preparation of cars for loading.

AAR is to be congratulated on this step. It not noly will curtail economic waste, but will result in better canning plant practices. However, where the damage results from poor practices or negligence on the part of the shipper, the fault is likely to be placed where it belongs. So wise shippers will make certain that canned goods go into the car in good condition, and that the load is properly placed and prepared for the bumps and jerks which are to be expected in its ride over the rails.

■ National Science Foundation Ought to Look Beyond Nutrition

Now that the National Science Foundation has been legislated into being, the question arises as to what it will mean to food processors.

The function of this agency is one of stimulating and coordinating government spending for long-range fundamental scientific research. It will have no laboratories of its own. Its appropriations will be used solely as grants for scholarships and for research in existing institutions.

One must look upon NSF as an extra "top" agency which will "correlate scientific programs undertaken by individuals and public and private research groups, including programs of Federal agencies."

There is no indication as to how much attention NSF will pay to food. Much depends upon the director and the 24 members of the National Science Board. It seems a fair assumption, however, that NSF will be interested

in nutrition research, as this fits into the "welfare state" line of thinking. Such research can, of course, be beneficial, as has that financed by food processors and directed by the Nutrition Foundation. But it is highly desirable that NSF's concept of food problems go beyond nutrition. For example, a great deal of basic research needs to be done on the need for and effects of chemicals in food, including those picked up from the soil, those contained in insecticide residues, and those added as preservatives and conditioners.

A second broad food problem is that of allergies. Either there is widespread, if mild, suffering from food-induced allergies or the medicoes are kidding a lot of long-paying patients. Many people are allergic to processed products, and sooner or later the industry will have to face this problem squarely. Yet, extensive basic research on allergies is outside the financial means of most food companies.

There is at least one food processing method which needs a lot of fundamental research. We refer to dehydration. This is particularly important. In wartime there will be a big demand for desiccated foods of good quality, just as there was in World War II. In peacetime, dehydration offers tremendous economic advantages through low-cost packaging, shipping and storage.

In addition to dehydrated foods, the QMC has unsolved food processing and packaging problems by the score. If NSF could help develop the answers to some of these through basic research, it not only would be helping to prepare us for a national emergency, but would be contributing to peacetime progress in food processing.

Yes, there are a lot of useful things NSF could do for the food industry, but we don't believe technologists in the food laboratories should fold their hands and wait for the job to be done. As yet, NSF is nothing but a piece of legislation. And unless it is operated more efficiently than many government agencies, its $15,000,000 annual fund may produce only about $5,000,000 in worthwhile research. Even at best, its funds will be spread pretty thin over the total area of science.

Nevertheless, the National Science Foundation could be a very useful force, if capably directed and if operated independently of politics and pressure groups. We still are in the elementary grades in respect to fundamental scientific knowledge.

▪ Role of Food Technologists in Wartime Should Be Clarified

From all surface indications, it appears that those in control of the military destinies of the USA have forgotten the role of the food technologists in World War II. Or perhaps this important lesson was never learned at all. Already the signs are beginning to indicate that Food Technology as a profession is again to be omitted from the list of specialized professions that will serve a great need in any future national emergency.

A discussion of the problem with the higher military authorities has revealed a strange—even erroneous— concept of the role of the food technologist in war. Also, Selective Service seems to think that any attempt to use a food technologist at his highest skill is merely an effort to exempt a young man from military service—"to take the rifle off his shoulder." This viewpoint also is shared by certain Quartermaster officers. Since some of the QM top brass seems to have had less experience with subsistence than other QM matters, the viewpoint is understandable, though not excusable.

Let it be definitely stated that in any war effort there is need for food technologists in the Armed Forces. And there also is need for food technologists in the civilian industries that are engaged in providing subsistence for the military. The further need for food technologists in the operation of civilian food processing industries will not be discussed here.

Even at the risk of inviting misunderstanding, it should also be stated that the number needed in the Armed Forces is usually less than the number needed by the food processors who are working on war contracts. It matters little whether these food technologists are in uniform or in mufti. What does matter greatly is whether the men in uniform are available for food technology or whether they have been assigned to M.P., K.P., Transportation Corps, aviation units or what-not, where it is well-nigh impossible to get them into positions in which they can be of maximum service as food technologists.

This appears to be a problem to which the Institute of Food Technologists should devote a considerable amount of attention and secure a correction of the erroneous thinking before it becomes too late. The fact that the Executive Secretary of IFT has had a long military career should help the organization to proceed with dispatch to a correction of the anomalous situation.

▪ Instruments Are Valuable Tools—If You Use Them Right

Instrumentation is now a normal part of the modern factory. In fact we are getting to the point where one expects to use instruments to obtain records of processing conditions. And in the trend to higher productivity and quality, instruments are being applied more and more to automatic process control.

But mere installation of instruments is only the first step in getting smoother and more economical plant operation. Installation of a precise meter accomplishes little unless equipment operators are carefully trained to take readings and then do something about them. And sometimes an automatic continuous record made by an instrument is like an aspirin tablet. It alleviates the plant headache for a short time but delays the application of proper corrective measures.

As instrumentation and automatic control are developed in the plant, there must be someone in management or in the control laboratory who has the responsibility for checking on these new aids to good work. First, it must be determined that the instrument or control device is accurate and is maintained in good operating condition. In larger plants, this may be done by an instrument specialist, while smaller plants often utilize the services of instrument manufacturers. Second, there must be a regular record made of readings or performance on critical processes, and here is where a recording instrument pays off. And then—most important of all—some competent technical review must be made to see whether the overall result which can be expected is being achieved, as well as whether process conditions are fluctuating beyond safe limits.

Good instrumentation is an extremely valuable tool. But management should be sure that competently trained workers and supervisors take advantage of this modern facility. Only then will you get the maximum dollar benefit from it through better quality, cheaper production, better working conditions—or perhaps all of these.

PRACTICAL IDEAS

Four Hints for Glass Jar Users

Lost operating time, breakage of containers, and personnel accident hazards have been reduced through four innovations at the Taylor Reed Co., plant, Glenbrook, Conn.

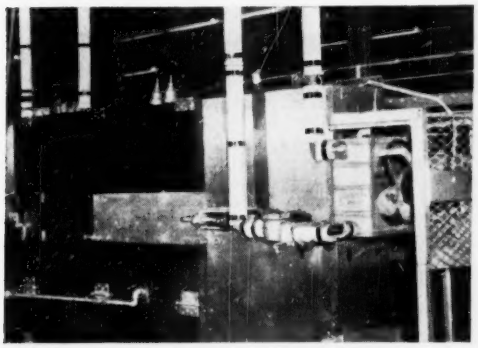
All four of the practical ideas concern the handling of glass jars. The first deals with "shock breakage", the second and fourth with breakage from jamming caused by stoppages on the line, and the third with breakage resulting from jars toppling on the conveyor. Here are the details:

Air-Blower Eliminates Shock

By subjecting glass jars to heated air currents as they enter the cleaner, shock breakage has been avoided entirely.

When the jars are brought from the warehouse during cold weather and filled with a hot substance, excessive breakage due to shock may occur. If the cases of jars can be brought from the warehouse and stacked in the packaging department long enough to warm, the breakage will be less. But this delay is not always convenient.

On the company's chocolate syrup filling line, the empty



HOT-AIR UNITS take chill off incoming jars.

jars pass through a cleaner and labeler and are then filled with hot syrup and closed. Breakage due to shock during the winter was excessive, and here space did not permit gradual warming in the packaging department.

The remedy was found in cutting away a section from both ends of the cleaning machine and attaching small unit heaters. These throw hot air on the cold jars entering the machine, heating the jars rapidly but not fast enough to produce shock.

Cost of the heaters and their installation was small compared to the cost of broken jars and lost time.

Side Shelf Prevents Jamming

Attachment of a simple fiberboard shelf to the conveyor connecting the labeler and the washer prevented bottles from backing up and causing breakage in the washer.

On the "Cocoa Marsh" production line, the sequence calls for cleaning the empty jars, then labeling, filling, and closing. When the line was first in operation, stoppages occasionally occurred at the labelling machine, causing the jars to back up on the conveyor from the cleaning unit.

Frequently, these jams resulted in glass breakage in the

$25 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get additional pay of $25.

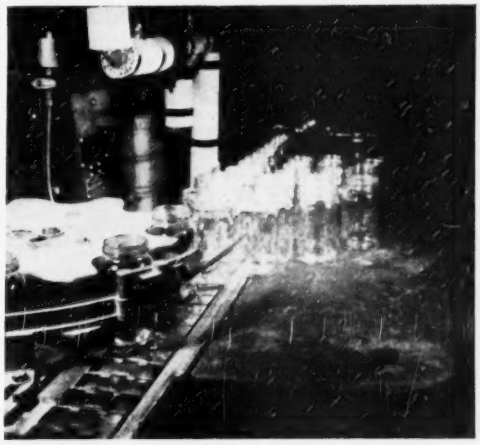
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD INDUSTRIES, 330 W. 42nd St., New York 18, N. Y.

MAY PRACTICAL IDEA voted best was "Four Screw Trough Conveyor Hints." It was submitted by W. A. Reed, Plant Engineer, Taylor Reed Co., Glenbrook, Conn., and Ivan C. Miller, FI Consultant.



GIVES LEEWAY for jars at critical point.

washer. And it took time to remove the broken glass, always an accident hazard.

Jamming was avoided by removing a section of the outside guide rail along the chain plate conveyor leaving the cleaner to feed the labeler. When there is no stoppage ahead, jars pass the gap without exiting. In the event of a stoppage, jars overflow through the gap onto the fiberboard shelf.

This shelf rests on straps welded to the frame. A good number of jars can collect here before any are crowded off. Usually the operator can stop the machines before any jars crash to the floor.

If the backing-up is due to line failure and is not noticed

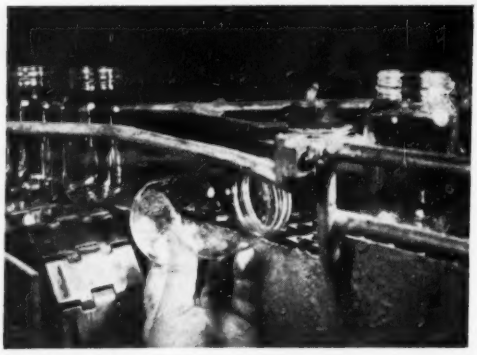
by the operator, the crash of the first jar on the floor warns him. A few jars broken on the floor can be swept up in quick time, as compared to the delay in removing broken glass from the machine. And the accident hazard is far less.

Fallen Jars Removed Automatically

Man-hours are saved, operating time is increased, and breakage losses were reduced by installing a simply constructed device that automatically removes fallen jars from the glass-pack production lines.

The cost of fallen jars in themselves often represents a tidy sum in the course of a year. The value of lost time caused by broken jars jamming machinery can be many times as much.

Automatic removal of fallen jars on a feed line may result in some breakage, but this totals less than when a fallen jar



TOPPLED JARS just roll out of way.

jams a machine. Here, many other jars may be broken before the machine is clear again.

One of the company's special removal devices is set (see photo) at the junction of the unscrambler and chain-plate feed belt. A plate bridges the space between the two, and a portion of the outer guide rail, one and a half times the height of the jar, has been bent outward.

The gap thus formed between the unscrambler frame and the outer guide rail is just wide enough for a jar traveling on its side to roll through. Meanwhile, upright jars slide onto the bridge plate and are transferred to the chain-plate feed line.

Accumulator Steps Up Production

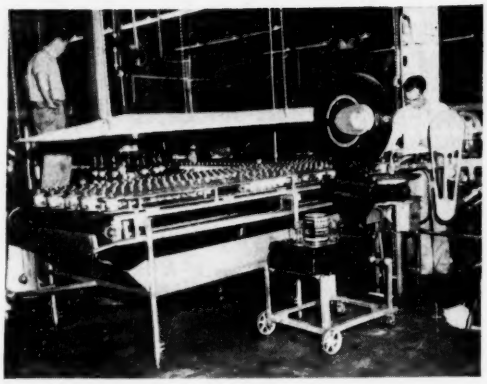
By building a unique accumulator for its chocolate syrup line, the company has increased output and reduced jar toppling and breakage.

The jars (1- and 2-lb.) are labeled before filling and closing operations, which are continuous. Operation of the labeler is intermittent, since it must be stopped to replenish the supply of labels, and for other adjustments. Speed of the labeler exceeds that of filler and capper.

To prevent interruptions in filling and closing, some provision was necessary to accumulate a supply of clean, labeled jars. Further, unless an accumulator was installed—to absorb jars labeled at a faster rate than the filler could handle—jamming, torn labels, and breakage would result.

The accumulator was designed and built to accommodate 500 or more jars (number depending upon jar size). It consists of ten parallel chain-plate conveyors, each approximately 10-ft. long, with adjacent conveyors traveling in opposite directions.

Two shafts are installed at opposite ends of the accumulator, each with a separate motor drive. Ten sprockets

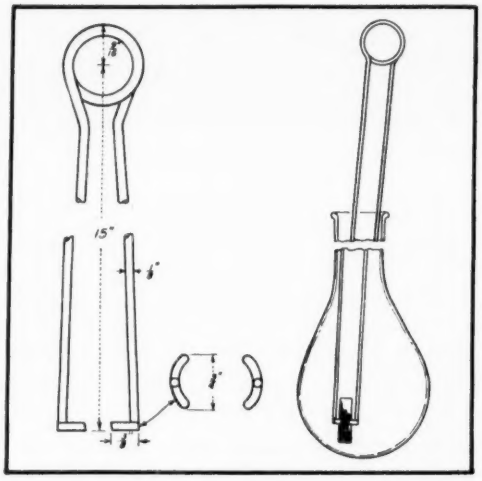


CONVENIENT table unit has capacity of 500-plus jars.

are mounted on each shaft. Every other pulley is driven with the shaft, the alternate pulley is an idler. The chain plate conveyors travel around these sprockets onto angle iron tracks, which provide a smooth conveyor surface.

Sufficient slack is provided below to permit the conveyors to dip into water in a trough underneath, for self cleaning. Jars are shuttled between demountable guide rails, which can be shifted to accommodate varying jar sizes.

At the end of a day's run, the accumulator, filled with a supply of labeled jars, is ready to start the next day's operations. These are protected by a metal awning. With this type of accumulator there is no need for unscrambling.—*W. A. Reed, Plant Engineer, Taylor Reed Co., Glenbrook, Conn., and Ivan C. Miller, Editorial Consultant, "Food Industries".*



Sample Testing Simplified

An especially satisfactory method has been found for the weighing and transfer of finely divided test samples.

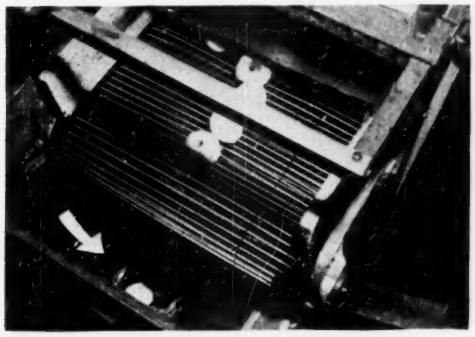
In determining nitrogen in fish meal by the Kjeldahl method, transfer of the weighed material to the flask without loss is difficult. This step can be simplified by weighing the sample in a small glass cell and then trans-

ferring the cell with its contents to the Kjeldahl flask by means of tongs designed for that purpose. These tongs (see sketch) can be fashioned from a medium spring-steel rod.

Glass cells can be made from flat-bottom shell vials. Usually, these vials as purchased are too long. They may be cut and dressed to any convenient length—20 to 40 mm. will be satisfactory.

For use when weighing volatile materials, a cap can be made by cutting a suitable length of a second vial, the inside diameter of which matches the outside diameter of the weighing cell.

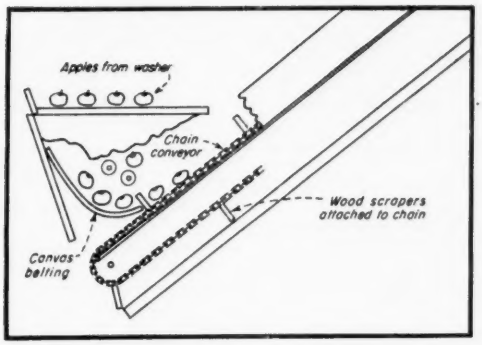
This same technic can be used in the transfer of precisely weighed materials to containers of other types than the Kjeldahl flask.—*Based on item in "Commercial Fisheries Review," December 1949.*



Canvas Belting Solves Transfer Problem

Addition of a piece of canvas belting at the point of transfer between a dewatering screen and a flight elevator has effected positive collection with a minimum of bruising of peeled fruit in the Fisher Spiegel Co., plant in Geneva, Ohio.

After apples are peeled, cored, washed and inspected they are elevated to a crusher and continuous cooker



for processing into apple sauce. Leaving the dewatering screen, apples fall onto the elevator and are carried up an incline to the crusher by wood blocks attached to the chain drive. As originally installed, many of the apples lodged in the foot of the elevator while the wood blocks were rounding the sprocket pulley at the bottom.

This difficulty was easily overcome by attaching a piece of canvas belting (see sketch) inside the conveyor trough, thus covering the opening through which the apples were escaping. Now, apples collect in the pocket formed by the belting and are emptied onto the conveyor by the wood blocks as they travel underneath the belting. In addition to preventing fruit escaping at the bottom of the conveyor, the belting also serves as a cushion.

YOUR MR. FI HAS BAG OF TRICKS

Continuing our comment on what your Mr. FI can do for you, here are a few hints on picking the *Practical Idea* cell of his brain.

As you well know, it takes a lot of "little engineering" to make a plant run smoothly. And by applying practical ideas to specific operations, you can save labor, break bottlenecks, eliminate chronic trouble, avoid product damage or improve sanitation.

For instance, a simple idea like the canvas belting trick described on this page: Just a bit of belt fabric in the right place, and products formerly damaged, if not entirely lost, in spills at a conveyor transfer, are caught in good shape and fed back on the line—all automatic, no pick-up labor needed.

In fact, most practical ideas are simple little things, so easy that when your Mr. FI calls something to your attention you will wonder why you didn't think of it yourself. But no one can think of everything. And often you may not realize that there is room for improvement until someone tips you off.

There is no doubt that Mr. FI can steer you toward the answers to some of your problems—The Editors.

Cool Bath Retains Sliced-Spud Quality

Installation of a 1½-hp. refrigeration compressor and water-cooling coils in the prepackaged sliced potato processing line has assured uniformity of product and plugged a serious profit-leak for the Kaufman Lunch Co., St. Louis, which packs 2,400 acetate bags of pre-sliced potatoes per day, ready for French frying.

Soon after the line was set up, a serious problem had developed. Sliced potatoes which should have remained fresh and crisp were wilting in the hot and humid weather, before they could be sealed into cellophane bags and placed under refrigeration. The result was deteriorated appearance and rapid spoilage.

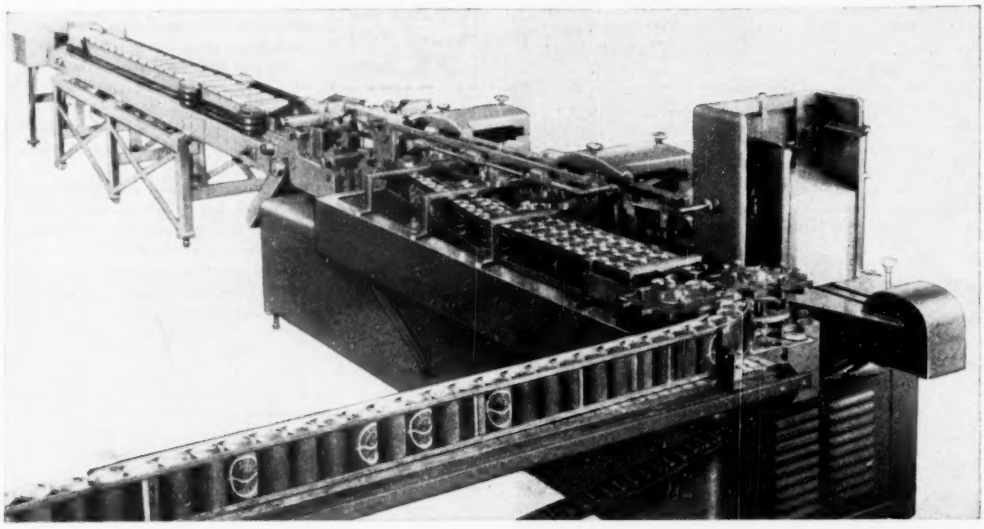
Source of the trouble was traced to the soaking tank, in which water was admitted at room temperature. To correct the condition, there was installed a set of two immersion coils connected to a 1½-hp. refrigeration compressor.

Now, a temperature between 30 and 40 deg. F. is maintained as desired, and the "cold bath" combined with treatment of the potatoes has kept the product at maximum crispness, with excellent eye-appeal and with spoilage curbed.—*Robert A. Latimer, Denver, Colo.*

V-Belt Unscrambler Patented

Island Equipment Corp., Long Island City, N. Y., has called our attention to the fact that it holds Patent No. 2,389,696 on a V-belt unscrambler similar to that described in the Practical Ideas department of the April issue of Food Industries, *Page 87.—The Editors.*

Food Equipment News



Automatically Packs Canned Beer in Half-Dozens A

Details have been released for a new machine that automatically cartons canned beer in lots of six. The first model was recently installed in the brewery of Drewrys Limited at South Bend, Ind.

Cans approach the unit in a single major lane, standing upright, then enter a rotary separator that divides the flow of cans into three lanes. Each lane leads to a star-wheel feed, and each feed takes two cans from its lane. Then, the carton (which has been automatically taken from the magazine and erected) receives two cans in succession from three star wheels in a smooth, continuous flow.

The cartons come in two forms—with four flaps to form a completely closed unit, or with three flaps and a hand-hold in the top panel for easy carrying.

Sealed cartons are discharged into a compression conveyor and are held for approximately 25 sec. to allow the adhesive to set. Leaving the compression conveyor, the cartons can be turned at right angles and discharged two abreast, or singly.

The can divider has been tested at more than 550 cans per minute. And the speed of the cartoner is well above 300 cans per minute if required.

Safety switches are provided throughout. If the can supply fails, a limit switch shuts off the machine. Another safety switch shuts it off if an out-of-round can enters the divider. The unit is also stopped if a carton blank proves defective and fails to open, and a gate is provided at this point to enable the operator to replace the carton.

Each star-wheel pocket is provided with a detector that will stop the machine if a can is omitted. By this means, a full carton can be guaranteed.—*Rockwell Packaging Machines, Inc., Box 314, Hudson, N. Y.*

"Poly" Continuously Heat Sealed B

Recently developed is a method of continuously sealing polythene (polyethylene) film.

This development makes use of specially prepared finishes containing fine particles of "Teflon" tetrafluorethylene resin which, after fusing at 750 deg. F., will provide metal surfaces with a non-stick coating.

For several years, sheets of Teflon have been used on bar sealers to eliminate the sticking of polythene film, but it was impractical to apply it in this form to a sealing wheel for continuous operation.

The rotary sealing wheel is aluminum with suitable heating elements and thermostat control. Surface of the wheel is approximately ⅛ in. wide. Edges are smooth and rounded. Teflon coated, the wheel is mounted in the conventional position on a standard heat-sealing bag machine.

To control accurately the pressure against the forming plate, the wheel is counterbalanced with an adjustable weight and the speed is regulated to the film travel over the forming plate. Cotton tape and sheet Teflon cover the forming plate at the point of contact with the sealing wheel. Recommended pressure of the wheel against the forming plate is approximately 1¼ lb.

Under these conditions, it has been found possible to seal polythene in tubular form at speeds ranging up to 100 fpm.

Want More Information?

It's free—and easy to get. Say for example, you want added details on the item marked "B" here on page 90. Just turn to one of the special Reader Service postcards inside the front cover and circle the 90B. Sign at the bottom and mail — no stamp needed. Then the extra information will be on its way to you.

At a speed of 65 fpm., satisfactory seals were made with 2-mil polythene film at temperatures ranging from 350 to 450 deg. F. Seals completed under these conditions are termed as strong or stronger than the body of the material itself.

The method is reported adaptable to many sealing mechanisms.—*E. I. Du Pont de Nemours & Co., Wilmington 98, Del.*

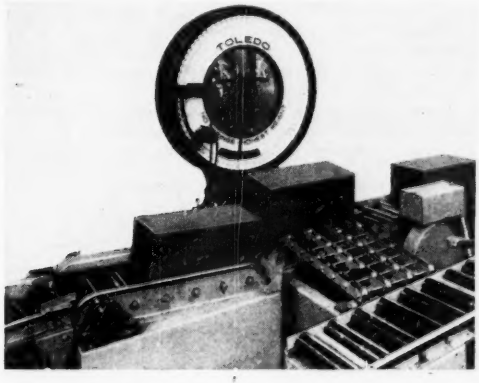
Backstop vs. Carrier "Run-Away" A

Bucket elevators, inclined conveyors, and similar equipment, are prevented from "backing up" or "running away" by a new, simplified backstop.

The unit, a ratchet-type device, operates automatically when power interruption, overload cutout, or failure of the prime mover occurs. It can be mounted in any position on the head shafts of conveyors or elevators.

As long as the shaft is turning in the proper direction, the pawl is entirely disengaged from the ratchet, eliminating drag, vibration and noise. Immediately upon reversal, the pawl automatically engages the ratchet and locks the shaft in place. The position is then held until forward power is again applied, when the pawl pulls out of the ratchet teeth.

The entire operation is reported smooth and positive, with no shock transmitted to the driven machine.—*The American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29.*



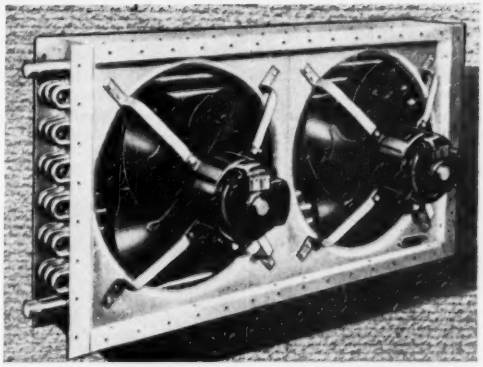
Off-Weight Unit Rejected B

For checking cases, cartons and containers, a new automatic weight-classifying scale has been announced.

This new unit, when installed in a conveyor system, will determine if filled containers are within a predetermined weight tolerance. It will also indicate whether a case contains the proper number of units, and if each unit in the case is full-measure.

Adjustable photo-electric controls are fitted. The unit advances "correct-weight" cartons along the conveyor and it can be adapted to either automatically reject "off-weight" cartons onto a separate conveyor, or to stop the main conveyor until the case is manually removed from the scale. It can also be made to count the number of cartons and print their weight.

This new device will handle up to 15 containers per minute. It is recommended for items having a gross weight of at least 15 lb.—*Toledo Scale Co., Toledo, Ohio*



Air-Cooled Condenser Saves Water C

Particularly for use in water-short areas, a new unit known as the Unicon has been developed to completely eliminate the necessity of using water with refrigeration compressors.

The development came about because an increasing number of communities are adopting restriction policies limiting the use of water with compressors for both commercial refrigeration and air conditioning.

New unit is a self-contained remote-type air-cooled condenser. It consists of a coil, housing, motor and fan, and it is being fabricated in six sizes, ranging in capacity from ¾ to 5½ ton.

Any air-cooled unit requires an ample supply of cool air, hence the hot air leaving the condenser should be removed from the area. It is not necessary to mount the unit next to the compressor; it may be advantageously placed near a window, wall opening, or in any well ventilated space within reasonable distance from the compressor. For outside mounting, the unit can be furnished with a special protective hood for the motors.

In conventional air-cooled units, the compressor motor must provide power for both the compressor and condenser fan, which reduces compressor speed and capacity. Since the new equipment uses individual motors and fans (twin fan unit is seen in photo), the full capacity of the com-

DON'T MISS THESE . . .

Sanitation stressed in a pump assembly which has a new type self-draining base.....Page 92

Compact grader for berries is sanitary, has high capacity, requires minimum of floor space.....Page 92

Delivery truck has hydraulically-operated refrigeration system driven by its own power take-off..Page 94

Bakery pans are handled in "batches" by a new labor saving cleaning machine .....Page 95

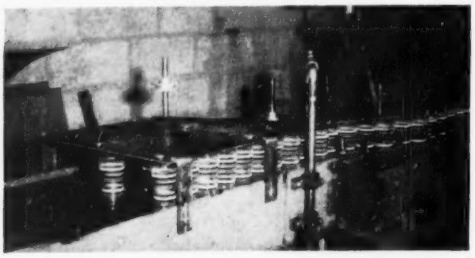
AND WATCH FOR . . .

Injection of correct amount of "pickle" into meats is simplified and speeded by new balance..In August FI

Single operator machine can pack up to 180 consumer units into shipping bags every minute..In August FI

pressor can be used for refrigeration, the same as with a water-cooled condenser.

The new unit can also be used in conjunction with a present water-cooled condenser. Here, its addition will result in a large saving in water with no loss of refrigeration capacity. The compressor will operate as air-cooled except during peak loads, when the water-cooled condenser would cut in on high pressure.—*Kramer Trenton Co., Trenton, N. J.*



Unscrambles Tumblers at High Speeds A

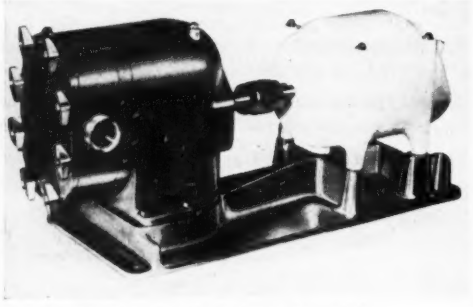
Wide mouth tumblers and other types of tapered containers can now be unscrambled at high speeds by a newly developed over-plate.

In addition to handling these tapered tumblers efficiently, the unscrambler can also accommodate conventional round containers, ovals, flasks and various odd or irregular shaped containers.

Principal difficulty encountered in the handling of groups or masses of tapered tumblers is their tendency to fall over or surge upward away from the conveyor belt when they are crowded together. This difficulty arises because the mouth of the container is wider than its base, and the containers tend to ride upward against each other along their tapered sides.

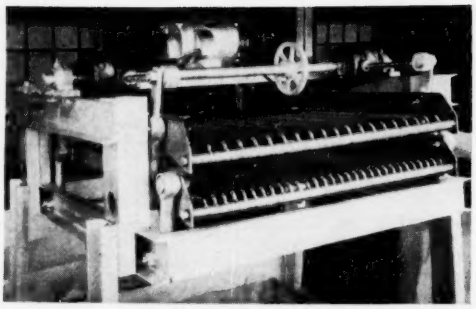
In the new development, a steel plate is carefully located above the moving belts of the unscrambling table so that its undersurface just clears the tops of the tapered tumblers. This plate prevents the tumblers from either tipping over or pushing upward.

It is provided with vertical adjustments to suit any particular size of container.—*Island Equipment Corp., 27-01 Bridge Plaza No., Long Island City 1, N. Y.*



Sanitation Stressed In Pump Assembly B

This direct drive deluxe model pump is mounted on a new type self draining base. Pump and base are made of highly polished alloy which is easily kept clean. Motor is totally enclosed, has a baked enamel finish.—*Waterous Co., St. Paul, Minn.*



Compact Grader Has Big Output C

This new sanitary berry grader is especially designed for high capacity with a minimum of floor space required.

The unit, 4x4 ft. without flumes or conveyors, has a 2½ to 6 ton per hr. capacity, based on the type of berries to be graded. It is termed completely sanitary, since no product comes in contact with base metals.

Grid bars offer a smooth surface unharmful to the berries in the process of grading. Change of grids is quick, there being only four bolts holding each grid.

Grading action of the grids is effected through four eccentrics. Grid frames are linked to balance each other in action and give a staggered design to the elliptical motion of the grid. This action assures a close grade with least damage to the fruit.

One grader makes three separations. Large fruit is discharged from top grid, medium grade from lower, and small fruit passes through both grids. Thus, the larger and softer fruit is taken out first to prevent damage and eliminate interference with the separation of other two grades. Smallest and hardest grade is collected at bottom in a pan, flume or conveyor.

To distribute berries to sorting tables or other processing machines, grader can be fitted with conveyors or flumes.—*Canning Machinery Co., 4525 S. W. Lee St., Portland 19, Ore.*

Dries Delicate Materials D

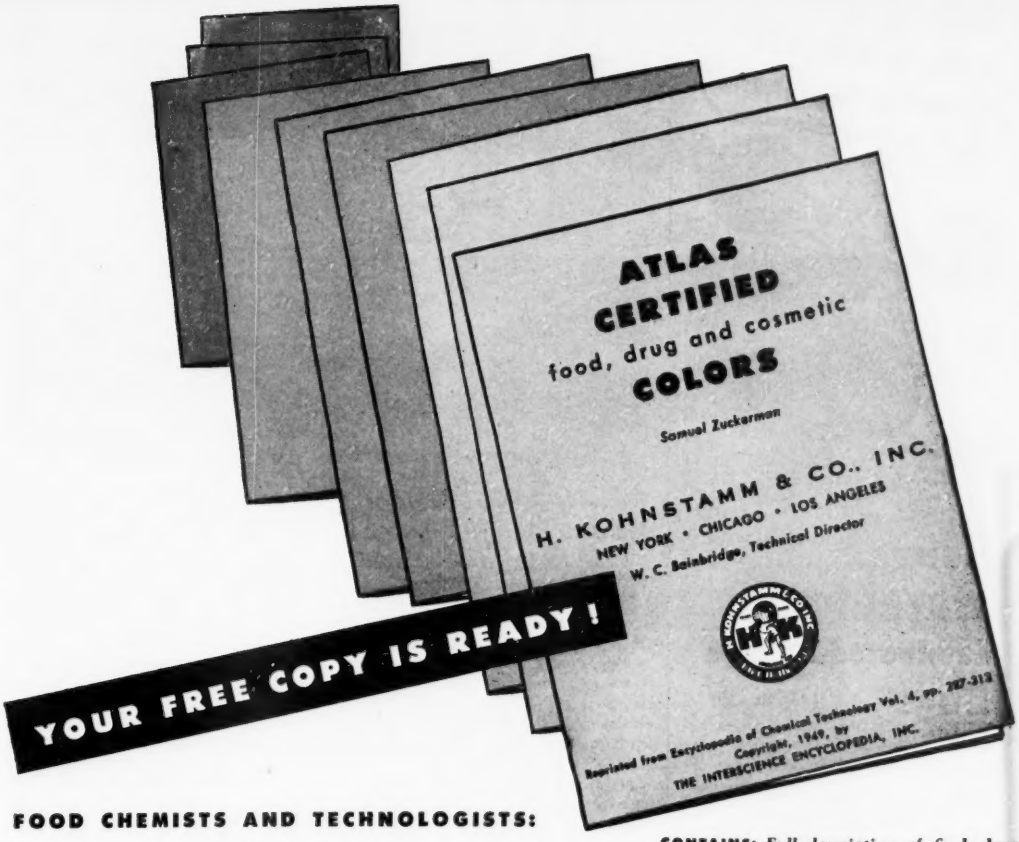
For drying materials, even while frozen, a new unit uses a radiant heat source. The machine is especially suited to the drying of those types of foods where heat sensitivity is an important factor. Materials dried while frozen are unchanged chemically.

The method uses infra-red radiation in certain very effective wave lengths in the "fundamental vibration region" where radiant energy is absorbed selectively by different materials, depending on the chemical composition of the material.

Thus it is possible to select radiation in the region where the greatest percentage of the total energy will be absorbed by the water in the product to be dried. This is an ideal method for driving off the water and thus drying materials which are damaged by temperatures above 100 deg. F.

Material may be in glass containers or on special trays with bottoms allowing passage of this radiation, which is applied only through the bottoms of the trays.

While large installations are likely to be tailor-made for individual product requirements, a compact, general purpose, self contained unit is available for laboratory or small-scale production use.—*Developed by Deep Freeze Corp.; manufactured by Proctor & Schwartz, Inc., Philadelphia 20.*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COLORS
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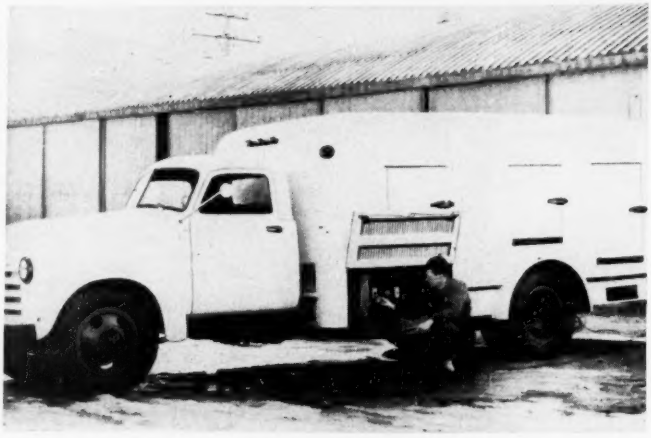


Delivery Truck Powers Its Own Refrigeration A

Many delivery benefits are offered by a new hydraulically-operated truck refrigeration system which is driven by the truck's own power take-off. It is a wholly mobile unit which generates constant, controlled temperatures every minute the delivery truck is on the road.

Greatest saving reported for the fleet owner is in weight reduction. Use of power take-off and the hydraulic operation reduces number of refrigeration-unit parts, thus saving an approximate 1,000 lb. with the average body.

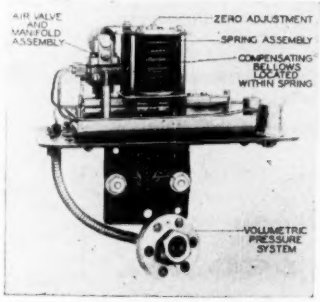
New system also extends the truck's delivery area by enabling combination of night transport with daytime deliveries. Overnight charging is eliminated.

Faster temperature build-downs are reported, bringing interior of body to desired low temperatures in quick time after starting the truck before morning delivery.

For periodic defrosting and cleaning, 4 hr. pull-downs are possible.

Mechanically, the condensing unit and hydraulic system are independent, for simplified maintenance. Condensing unit, located at the lower left front corner of the body, slides in and out for fast maintenance. Mounted beside the small fluid motor is an auxiliary electric motor for emergency use. Temperature controls are easily accessible just inside the access door.

Installation of the new system requires no chassis alterations, which allows for greater resale value of chassis and permits truck guarantees to remain in force—*Batavia Body Co., Batavia, Ill.*



Pressure Transmitter Has 1,000 Ft. Range B

It is now possible to measure and transmit up to 1,000 ft. the smallest of pressure changes with an accuracy of ½ percent of range span. Used is the new force-balance type Transaire Pressure Transmitter, developed as a companion to a similar temperature transmitter.

A few of the instrument's outstanding features are described below.

Narrow range spans of 20 to 40 psi. are available over range limits of 35 to 415 psig. with sensitivity of .1 percent or .02 or .04 psi., depending on range span used.

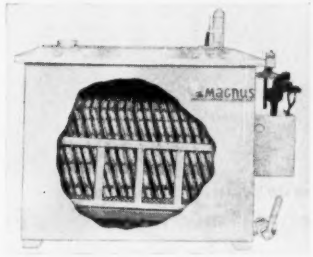
Volumetric type pressure system has Type 316 stainless steel connection and pressure sensitive diaphragm. The solid filled system was incorporated into the design as a means of protecting the relatively thin and sensitive metallic diaphragm in the capsular chamber from process materials that might have a corrosive effect.

Regardless of the pressure range or span, the output of the transmitter is always linear from 3 to 15 psig. This

calibration feature eliminates the necessity for individual calibration of matching receivers or receiver-controllers. Instrument transmits an output pressure which is proportional to the measured pressure with an accuracy of ±0.06 psi.

Operating ranges can be varied by a simple screwdriver adjustment. Continuous adjustment of any range span can be made within the range limits of the instrument.

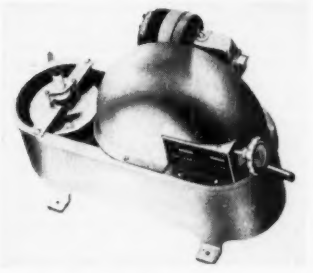
When operating conditions vary or it is necessary to transfer the instrument from one application to another having an operating range beyond the range limits, the transmitter's spring subassembly can be changed.—*Taylor Instrument Companies, Rochester 1, N. Y.*



Bakery Pans Cleaned In Automatic Unit A

Bread, bun, cake and sweet-goods pans are handled in "batches" by a new labor saving automatic cleaning machine.

In this "Pan Dip" machine, the basket of dirty pans is placed on a "see-saw" platform and is mechanically agitated 160 times per minute in cleaning solution. Dual agitation of

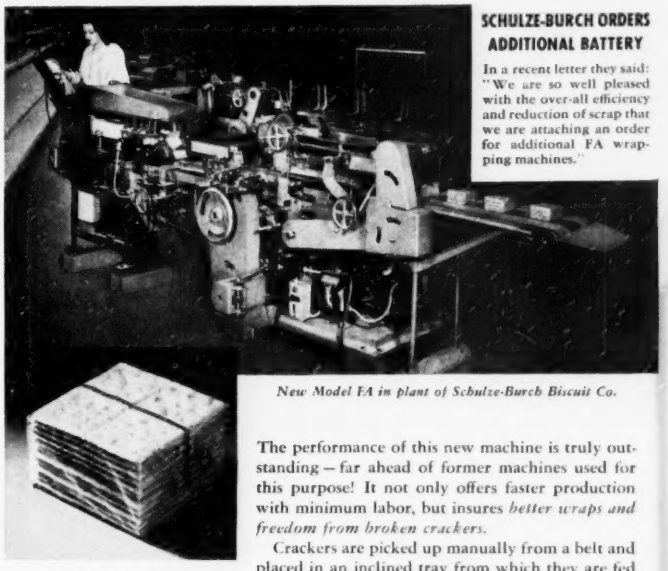


Feeds Small Quantities B

Construction in various types of chrome-nickel steel adapts this reagent feeder to the food processing industry. Feeder capacity ranges from 2 drops to 2 liters per min.—*The Clarkson Co., 564 Market St., San Francisco.*

NEW Machine with Automatic Feed

for wrapping ¼ pound units of crackers



SCHULZE-BURCH ORDERS ADDITIONAL BATTERY

In a recent letter they said: "We are so well pleased with the over-all efficiency and reduction of scrap that we are attaching an order for additional FA wrapping machines."

New Model FA in plant of Schulze-Burch Biscuit Co.

Wrapped in the nude, with or without easy-opening tape.

Automatic feed counts ¼ pound unit. REJECTS ANY BROKEN CRACKERS.

•

Machine can be built for heat-sealing cellophane or waxed paper. Printed registered material may be used, if desired.

The performance of this new machine is truly outstanding – far ahead of former machines used for this purpose! It not only offers faster production with minimum labor, but insures *better wraps and freedom from broken crackers.*

Crackers are picked up manually from a belt and placed in an inclined tray from which they are fed by gravity into the auxiliary feed. The auxiliary feed *automatically rejects any broken crackers, counts out the proper number* for a quarter-pound wrap and deposits them into the feed conveyor of the wrapping machine. Under normal conditions a speed of 65 units per minute can be obtained.

A new type, spring-mounted folding and sealing line in the wrapping machine moves in and out with the slightest variations of products, avoiding breakage in the wrapping process.

Machine can be built for heat-sealing cellophane or waxed paper and will handle printed registered material. Easy-opening tape can be incorporated in the wrap, if desired.

This type of wrap is becoming more and more popular. And the new FA is the machine you need to produce it most efficiently.

Write or phone our nearest office for full particulars.

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS
DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D. F.

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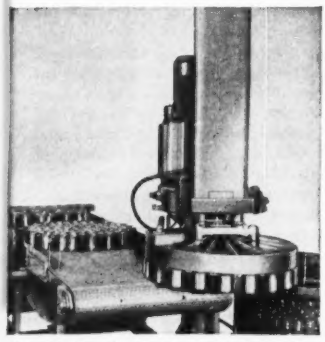
Combine Movement with Processing Through Fire or Water

Cambridge Wire Belts shrug off extremes of temperatures, corrosive agents, torsion, strain and wear. They hustle rough, bulky objects through the most rigorous treating processes, or convey delicate products with maximum safety.

Tempering, quenching, washing, baking, sizing, sorting, packaging, glazing; throughout industry, Cambridge Wire Belts are working at nearly every bulk material processing job. Each of these Cambridge Belts is fabricated in the proper mesh, weave, metal or alloy to do the job better, faster, safer and more economically.

Let a Cambridge Field Engineer help you secure these advantages for your operation.



A Cambridge "Gratex" Wire Belt conveying baby food jars to a W. F. & John Barnes Junior Hydro-Magnetic Crate Loader and Unloader. The small-bottomed jars won't tip or trip when shuffled on this closely-woven belt.

Write for FREE copy of the 130-page, illustrated Cambridge Wire Belt Catalog. It's an education in belt and conveyor design, application, installation and operation.

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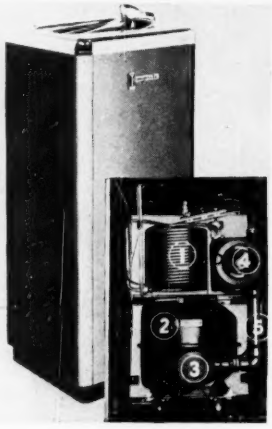
both the work and the solution forces the chemical cleaner against and into all interior and exterior surfaces.

This forceful shearing and scrubbing action quickly removes rancid grease, charred fats, carbonized dough and other soils thus eliminating hand scraping.

Machine is construted in four different sizes to fit the baker's cleaning needs. Heating is by steam, gas, electricity or kerosene. Agitating platform can be operated by an air motor or electric motor.—*Bakery Div., Magnus Chemical Co., Inc. Dept. FI Garwood, N. J.*



Safe Water Cooler For Hazard Areas A

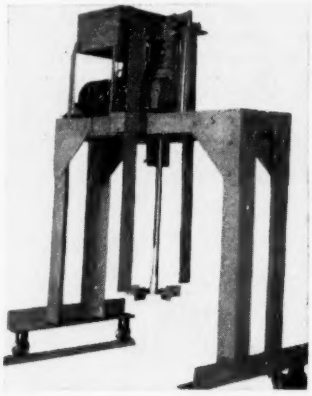
For use in potentially combustible atmospheres is a specially designed new self-contained drinking water cooler.

Unit may be installed with complete safety, it is claimed, in customarily restricted areas, such as grain processing plants and paint shops. Design of the cooler makes it impossible for any operating mechanism to generate static electricity, nor can the electrical system produce possible open sparks, which could cause an explosion in certain atmospheres.

Referring to photo, compressor and motor are hermetically sealed (2); compressor terminal box (3), relay, thermostat control (4), and all electrical wiring and fittings (5) are enclosed in approved, explosion-proof housings and conduit. A water cooled condenser (1), unaffected by lint or dust laden air, increases the unit's water cooling efficiency. Rated capacity 10.3 gph.

Outside water pressure variations of as much as 20 to 85 lb. have no effect, it is stated, on the ability of the cooler to deliver a smooth, even flow of drinking water.

Available on special order are stainless steel front and side panels, recommended for use where the cooler is subjected to corrosive atmospheric conditions.—*Temprite Products Corp.,* 47 *Piquette, Detroit* 2.



Heavy-Duty Agitator Serves Tank Row B

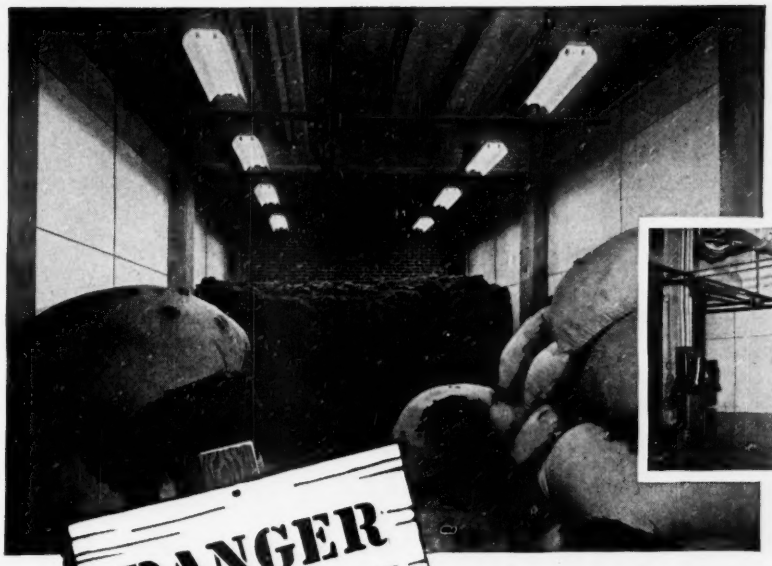
Designed for batch mixing and blending, a new heavy-duty liquid agitator is constructed for quick movement from one tank to another in a row.

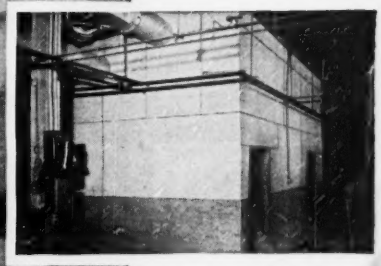
The unit was originally developed for paint tinting, an application requiring a heavy-duty, easily movable unit of this type. Tests indicate the new agitator will handle tinting in 1/8 to 1/6 the time formerly required, and comparable results are predicted for tank operations in the food field.

The agitator is a turbine-type unit containing all components necessary for complete and efficient batch mixing processes. It connects to the plant electrical supply. Mounted on casters, it rolls on a track from tank to tank as required. Correct mixing speed for each individual batch can be selected quickly with a simple variable-speed control.

Shaft and impeller are raised and lowered in the tank hydraulically. To switch from one tank to another, the operator merely sets two levers, releases a floor lock, and wheels the unit to its new position.

Unit is supplied in capacities up to 4.5 hp. at the impeller. The maker recommends and supplies the correct electric motor and impeller size for the individual application. Shaft, impeller and baffles can be furnished in a wide variety of metals to suit individual process requirements.—*Mixing Equipment Co., Inc.,* 1024 *Garson Ave., Rochester* 9, *N. Y.*





Two of several wool bins in the Hardwick and Magee Spinning Mill—built with K&M APAC.

ON GUARD: K&M "Century"® APAC

When raw wool or processed wool is stored in bulk, there's danger of fire—not only from external causes, but also from spontaneous combustion. That's one of the reasons the Hardwick and Magee Company, nationally known carpet and rug manufacturers, chose K&M APAC for the construction of these wool bins in their modern spinning mill.

K&M APAC—specially processed sheets of asbestos-cement—resists fire effectively and dependably. The smooth, hard finish of APAC prevents fibrous matter and dust from adhering to the surface—reduces materially the opportunity for fire to spread. And K&M APAC stops the other enemies of raw materials, also—weather, rust, rot, termites, and rodents can't affect it.

You'll like the installation economies you get from using K&M APAC, too. Sheet sections are large (4′ x 8′) and strong, but not bulky; they handle easily, can be cut and fitted on the job, are quickly erected. And you save on maintenance costs, too, for K&M APAC doesn't need even paint to preserve its attractive finish.

It will pay you to consider K&M APAC Asbestos-Cement Sheets for such needs as panels, partitions, sheathing, shaft casings, bins, in fact, for all flat surfaces both interior and exterior. APAC can be applied over insulation boards, wood studs, solid wood sheathing, steel or wood girts. It's adaptable and economical—the perfect answer to flat surface covering problems.

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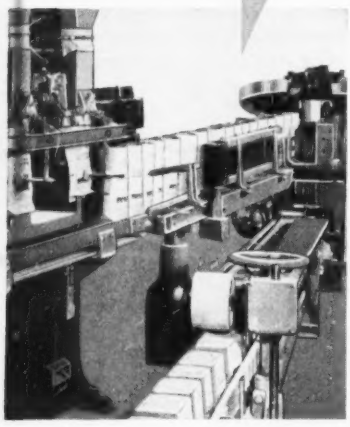
DELTASEAL PACKAGING EQUIPMENT

Equals

The Most Economical, Efficient Package for Your Product



- Deltaseal® filling and closing is fast . . . mostly automatic . . . less handling.
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- Crisp, brilliant Bemis printing on Deltaseals headlines your brand.
- Consumers like Deltaseal's exclusive Pull-Cut-Pour Spout.
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Norfolk • Oklahoma City • Omaha • Peoria • Phoenix • St. Louis
Pittsburgh • Salina • Salt Lake City • San Francisco • Seattle
Vancouver, Wash. • Wichita • Wilmington, Calif.

Detects Fluorescent Soils A

This small, portable, long-wave ultra-violet light is used like a flashlight. When beamed against equipment or into cans, it excites fluorescence in milkstone, fats, and extraneous soils not readily apparent to the eye. Light also detects rodent contamination of stored materials.—*Klenzade Products Inc., Beliot, Wis.*

Equipment Briefs

Stainless Steel Tubing B

Suitable for use in connection with foodstuffs, a free-machining welded stainless tube is now being made. It resists most of the organic and a wide variety of the inorganic chemicals. Designated Type 303 this stainless tube is recommended for parts that must be fabricated by either threading, turning, or reaming. And it is suitable for making intricate or difficult-to-machine parts where smooth surfaces are required. Tube is available in rounds and shapes from ¼- to 4½-in. o.d. and in all standard wall thicknesses.—*The Carpenter Steel Co., Alloy Tube Div., Union, N. J.*

"Extra Wide" Aluminum Foil C

Thin gage .00035-in. aluminum foil for packaging can now be obtained in standard widths of 50-in. Foil of this gage is traditionally used in combination with kraft, scrim and glassine papers for candy, cigarettes, frozen food over-wraps, and scores of other packaged commodities.—*Aluminum Co., of America, 801 Gulf Bldg., Pittsburgh 19.*

Wraps Crackers D

Now in successful operation is a new machine that wraps ¼-lb. units of soda crackers and heat-seals them in cellophane without cardboard. After being wrapped, units are packed in usual cartons. Machine has speed of 65 packages per min.—*Package Machinery Co., Springfield, Mass.*

Protects Motors E

Small motors used with fans and pumps are reported controlled and protected by the new Motor Sentinel, a manual starter with positive bimetallic overload protection. It is designed to fit any standard 2½-in. wall box. With a front-removable heater of the proper rating, unit permits time delay for starting and allows motors to carry overloads up to their safe capacity without disconnect from the line. Moreover, it will automatically disconnect motor on any sustained or damaging overload.—*Westinghouse Electric Corp., Box 2099, Pittsburgh 30.*

—*End*

Trucks get there *FASTER* at Lower Cost with... EATON 2-Speed Truck AXLES

By combining pulling power and speed, Eaton 2-Speed Axles add to truck utility and permit faster trips, more pay-load miles—on the highway or off. Eaton Axles reduce stress and wear on engines and all power transmitting units. This means longer life and minimum maintenance cost... and Eaton's planetary design adds thousands of miles to *axle* life. Gear tooth loads are better distributed; gear speeds are slow; stress and wear are held to a minimum. Eaton Axles are available for most trucks of 1½ tons and larger. Ask your truck dealer for a road demonstration.

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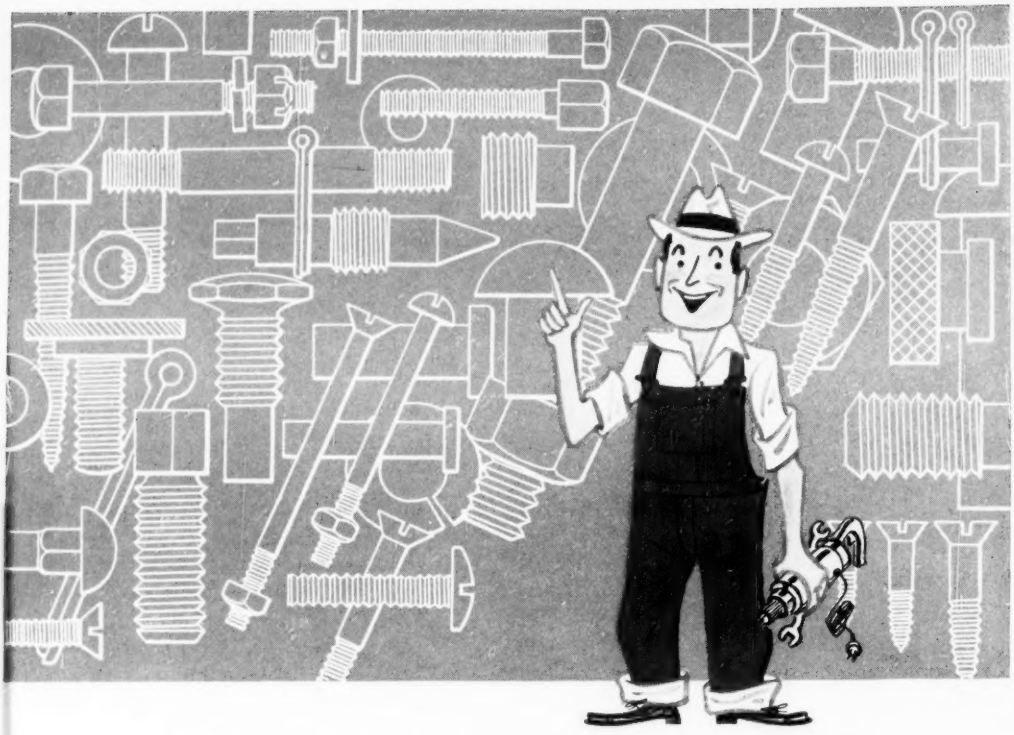

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LEADING PRODUCERS OF FASTENERS USE ALLEGHENY METAL

A complete line of stainless steel fasteners—all types and sizes of bolts and nuts, rivets, wood and machine screws, cotter pins, washers, etc.—are made of Allegheny Metal by the leading manufacturers in this field. Get in touch with them for catalogs and prices, or write us direct.

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PITY the poor fasteners! All they do is hold just about everything together . . . and isn't that an important enough job to warrant using the *best* —the kind made of stainless steel?

After all, nothing is any better than the bolts and nuts, rivets, nails, screws or pins which assemble it. That's why fasteners made of Allegheny Metal *pay.* They're a sure sign of quality and value at little, if any, extra cost . . . won't wear out, can't wear off, resist rust and heat, stay bright and strong agelessly. You can use them on wood, plastics or other metals—and if it's important, there's a high re-use factor.

Allegheny Metal fasteners are available in complete variety, made by the leading manufacturers in this field. Check up on what they'll do for *you,* won't you?

ALLEGHENY LUDLUM STEEL CORPORATION
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Nation's Leading Producer of Stainless Steels in All Forms

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ALLEGHENY METAL is stocked by all Joseph T. Ryerson & Son, Inc. warehouses

MILK

Batch—2,000 gallon tank truck.

Operation—Stirring to insure uniformity before dumping or sampling.

Mixer—LIGHTNIN S-2, ½H.P. portable mixer, direct drive, totally enclosed motor, stainless steel shaft, propellers, tube and chuck.

CATSUP

Batch—300 gallon open tank.

Operation—Stirring while cooking, to prevent burning.

Mixer—LIGHTNIN D-2, ½ H.P. portable mixer, gear drive, with totally enclosed motor, stainless steel shaft and propellers. Stainless steel tube and chuck; bronze housing.

LARD

Batch—1,000 gallon open tank.

Operation—Rendering or blending batches.

Mixer—LIGHTNIN D-3, 1 H.P. portable mixer, gear drive, with totally enclosed motor, stainless steel shaft and propellers.

EXTRACTS *(water base)*

Batch—100 gallon open tank.

Operation—Simple blending.

Mixer—LIGHTNIN C-4, ¼ H.P. portable mixer, direct drive, with semi-enclosed motor, stainless steel shaft and propellers.

Modifications—With alcohol use explosion-proof motor.

MAYONNAISE

Batch—200 gallon closed tank.

Operation—Premixing ingredients before going to colloid mill for high uniformity.

Mixer—LIGHTNIN 33G-50, ½ H.P. nozzle mounted mixer. Gear drive, with totally enclosed motor, stainless steel shaft and propellers.

MILK *(Pasteurizing)*

Batch—100 to 150 gallons—open tank.

Operation—Stirring while heating.

Mixer—LIGHTNIN LDG-25, ¼ H.P. permanently mounted mixer, gear drive, with totally enclosed motor, stainless steel shaft and propellers.

SALT BRINE *(canning)*

Batch—500 gallon open tank.

Operation—Dissolving salt in water.

Mixer—LIGHTNIN S-3, ¾ H.P. portable mixer, direct drive, with totally enclosed motor, monel shaft and propellers. Monel tube and chuck. Bronze housing.

MUSTARD

Batch—600 gallon open tank.

Operation—Mixing vinegar, water and essential spice oils. Dissolving salt in the mix. Keeping mustard seed in uniform suspension while drawing-off to colloid mill.

Mixer—LIGHTNIN D-3 1 H.P. portable mixer, gear drive, with totally enclosed motor. Stainless steel shaft, propellers, tube and chuck.

YOU CAN STANDARDIZE ON Lightnin® Mixers (MIXCO® Engineered)

BECAUSE THERE'S A *LIGHTNIN* FOR EVERY MIXING JOB!

Shown here are eight of the many reasons why LIGHTNIN is the world's largest-selling line of portable mixers. *No matter what you mix*, there is a LIGHTNIN to do the job faster—better—for less.

LIGHTNIN gives rapid bottom-to-top turnover, plus slow rotation—the famous patented "double mixing action" that mixes faster, more uniformly. Every part of the LIGHTNIN is designed *specifically* for mixing. Notice the smooth, easy-to-clean contours . . . the quick-opening swivel clamp that permits adjustments to any angle . . . wide selection of special motors, propellers, and corrosion-resistant metals.

LIGHTNIN is backed by MIXCO's 25 years of experience in making nothing but fluid mixers. Many LIGHTNINS are in service twenty years and more. And every LIGHTNIN is covered by a money-back performance guarantee!

Write today for information and prices.

THERE ARE MORE THAN 100 STANDARD LIGHTNIN MODELS. If you are a first-time LIGHTNIN user, please ask us to recommend the best one for your conditions.

SEND FOR big 28-page illustrated catalog on portable mixers. Much of its helpful data on mixing is available from no other source. Ask for Catalog B-75.

MIXING EQUIPMENT CO., INC.

(MIXCO)

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IN CANADA: WILLIAM AND J. G. GREEY, LTD., TORONTO

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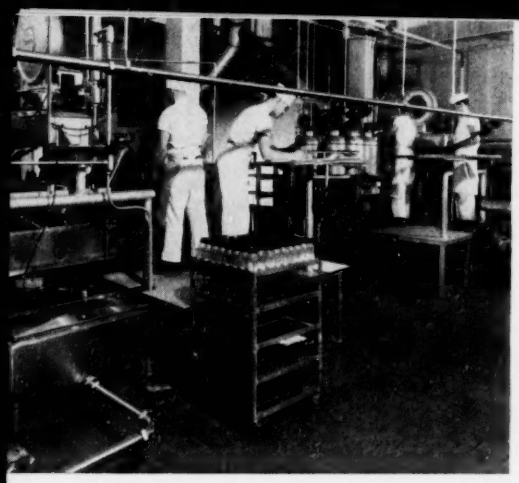
- ☐ B-75 Portable Mixers (electric and air driven)
- ☐ B-78 Top Entering Mixers (permanent mounting)
- ☐ B-89 Turbine and Paddle Type Mixers
- ☐ DH-50 Laboratory Mixers

Name ..... Title .....

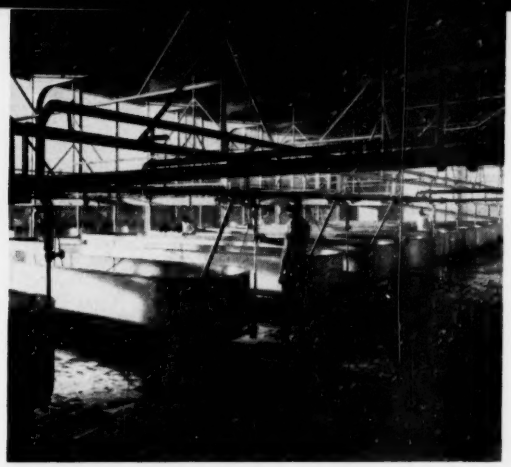
Company .....

Address .....

City ..... Zone ..... State .....



1 **MILK** for cheese is dumped from cans, weighed, and sampled at these receiving stations.



2 **CHEESE VATS** of stainless steel, with capacities of 20,000 lb. each, are starting point in the operation.

How Cheddar Cheese Is Made

Process Keyed for Top Utilization Through Output of Allied Products

(Article on Page 44)

PRIMARY PRODUCT at the new $1,500,000 plant of Tillamook County Creamery Assn. is Cheddar cheese—83 percent of the output. How this operation is carried out is detailed in the foldout flowsheet (right). Accompanying photos, which are keyed by number to the operations, illustrate the process.

Other products are also made in the plant—pasteurized and bottled Grade A milk and cream, butter, ice cream, buttermilk, cottage cheese and chocolate milk. How these operations are integrated with cheese making is also shown in the flowsheet.

First step in all of the processes is receiving of milk—depicted at Point 1. Here, the 10-gal. cans are dumped, and the milk is weighed and pumped to holding tanks. A small part of the cheese milk is heated and separated to provide skim milk and cream for standardizing. The equipment is used again later to separate the remaining fat from whey before it is condensed for poultry feed.

For cheese-making, there are ten 20,000-lb. vats—Point 2. And mounted on an overhead track above each tank are two 2-speed agitators which move back and forth from the center to each end. Interchangeable paddles are employed to provide different types of agitation for various stages of the operation.

When the cheese curds have been made, drained free from whey, and salted, they are filled into cheesecloth-lined hoops and placed in hydraulic presses—Point 3—where a first pressing of approximately 35 psi. is applied for 35. min., and later an overnight pressing runs about 16 hr. Subsequently, the dressed cheese is hand-trucked to the 50-deg. dry room for 3 days' storage.

Following this storage, the cheese is dipped in paraffin and moved to the 50-deg. curing room for an additional 3 to 6 weeks—Point 4. Then it is returned to the dipping room, given an additional coat of wax, and placed in the 36-deg. storage for final aging.

Two types of packaged cheese are made at Tillamook—½- and 1-lb. wrapped and sealed Cheddar, and Club cheese. For these products, curds are filled into 20-lb. rectangular stainless steel hoops, pressed twice, wrapped in Pliofilm, over-wrapped in glassine, and placed in wooden boxes. Boxes are palletized and moved by fork truck to the 80-deg. room. After 36 hr., pallet loads are moved to the 36-deg. room for 3 to 5 months aging, then go back to the 80-deg. room for tempering.

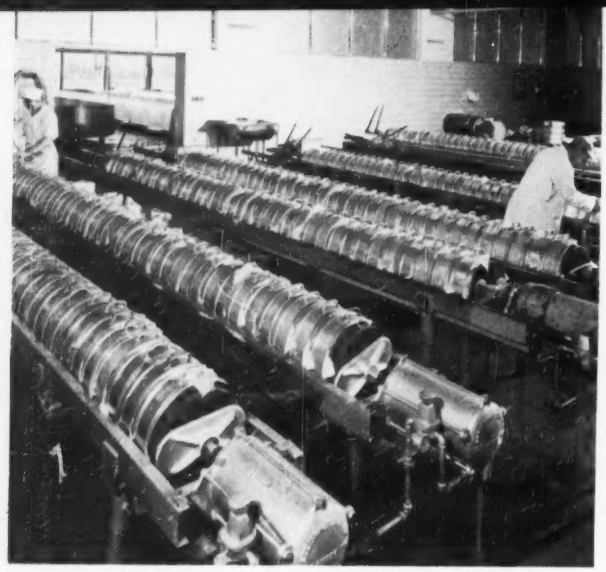
The 20-lb. blocks are cut into the required sizes—Point 6—check-weighed, hand-wrapped in Pliofilm, then machine-wrapped in cellophane and heat-sealed. Wrapped pieces are packed in cases, returned to the 80-deg. room for 12 to 36 hr., and finally moved to the 36 deg. room for storage.

Club cheese is made by grinding together rindless and triplet cheeses and blending them with flavoring ingredients. The mixed cheese is then stuffed into printed Pliofilm sleeves, check-weighed, the ends tied with string, and the finished product packed into cartons.

FOOD INDUSTRIES July 1950 Pages 102-105

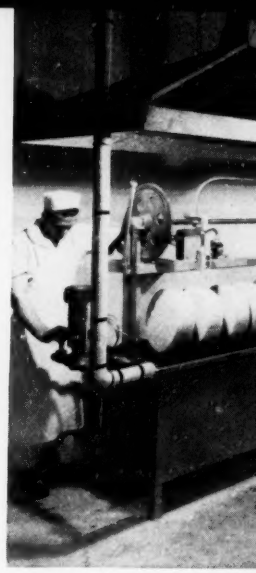
ADVANCED FOOD PLANT ENGINEERING

FI Picture-Flowsheet 19

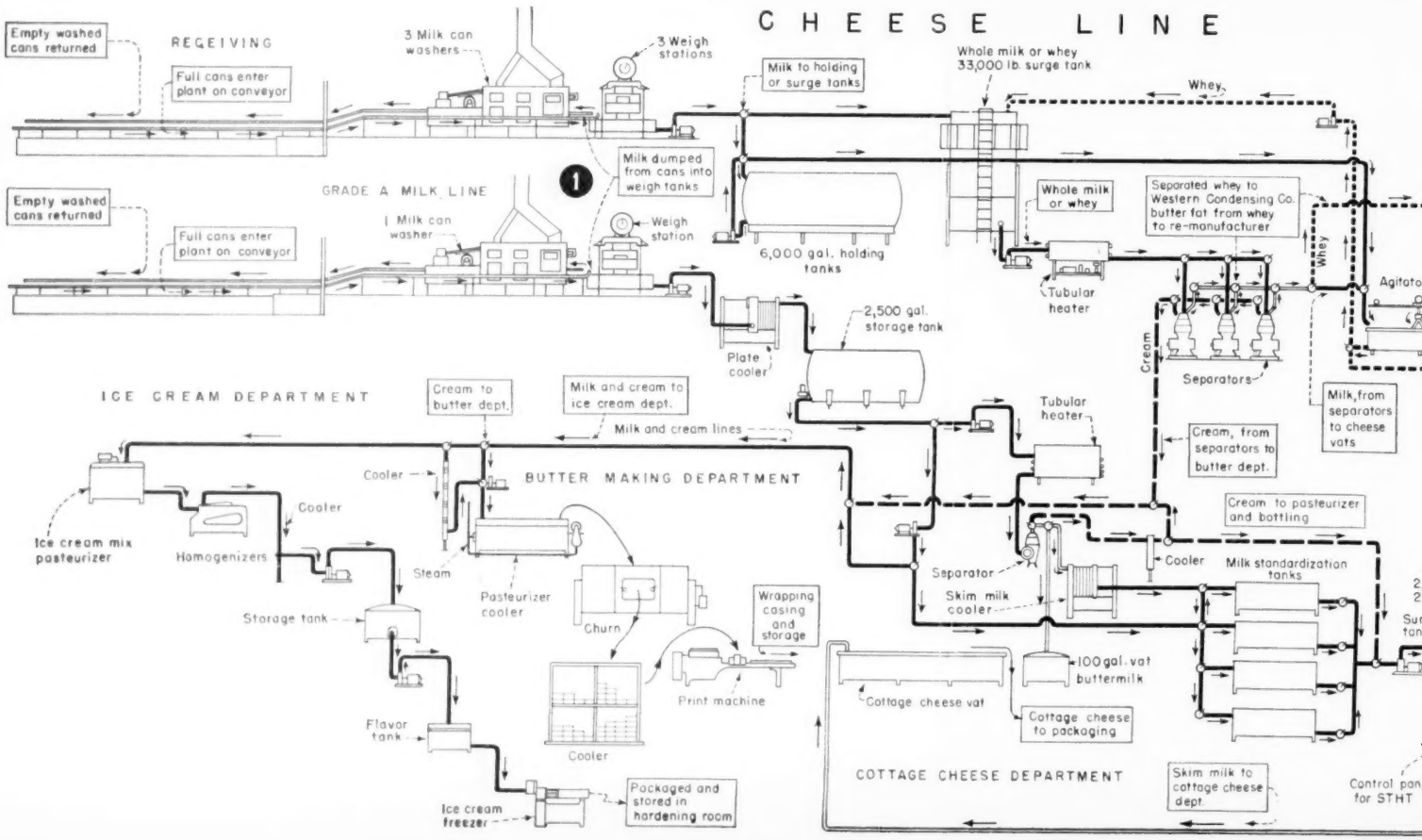


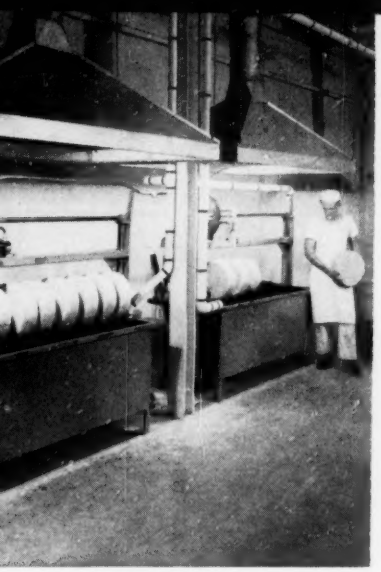
3 **HYDRAULIC PRESSES** apply pressure to curd in hoops to remove remaining whey and form homogeneous mass of cheese.

4 **DRYING ROOM** where cheese is held 3 days prior to wax coating. Here brand name "Tillamook" is applied.

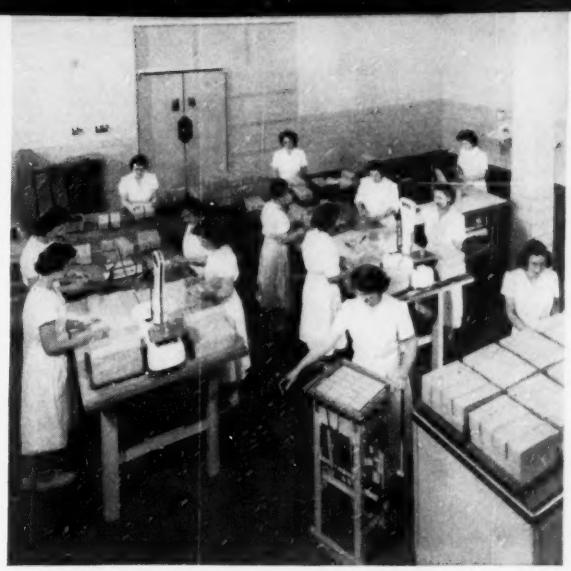


5 **PRESSED CHEESES** are r
then in a paraffin-wax mixt

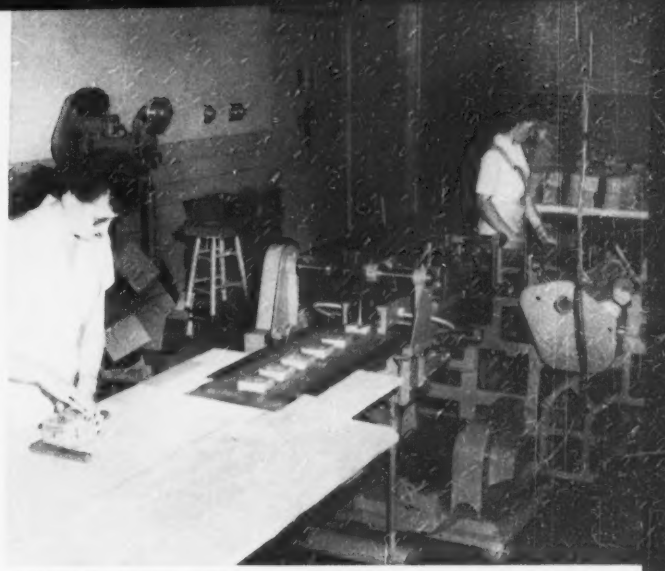




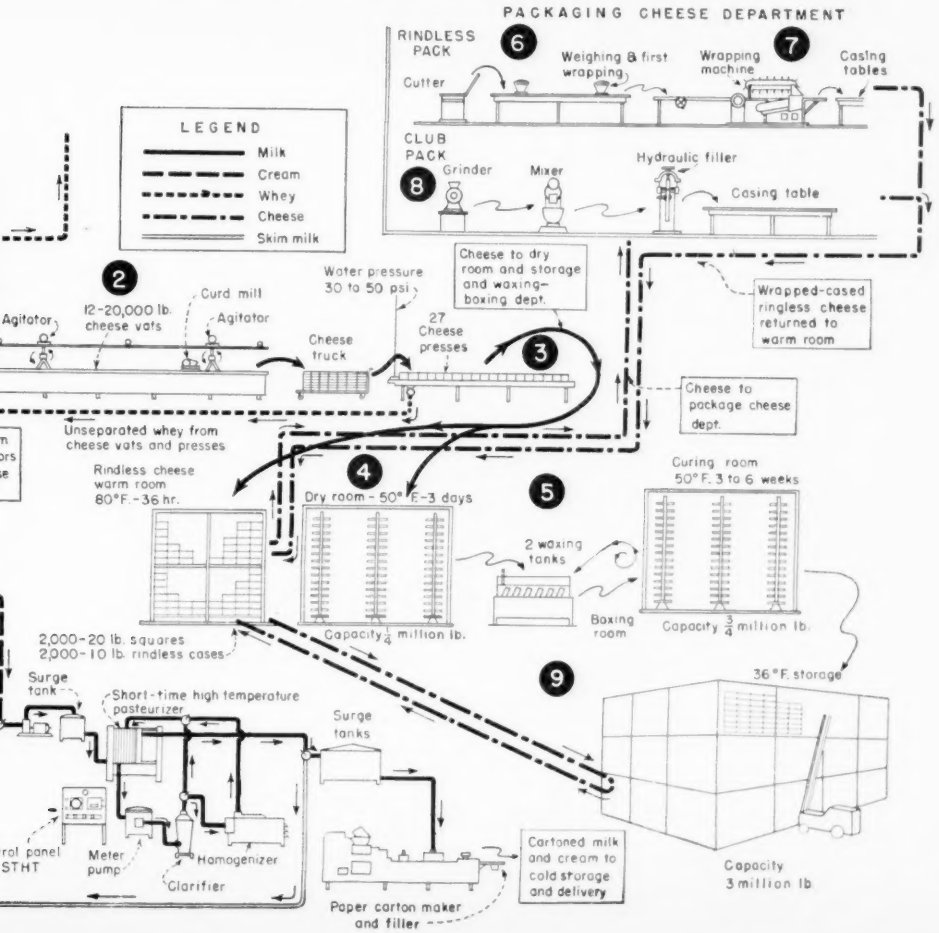
are mechanically dipped in melted paraffin, mixture, in these dipping tanks.



6 **RINDLESS CHEESE** is cut into ½- and 1-lb. blocks with a butter cutter, then check-weighed and wrapped in Pliofilm.



7 **HAND-WRAPPED BLOCKS** are then conveyed to machine that over-wraps and heat-seals them in cellophane at rate of 80 packages per min.



8 **CLUB CHEESE** is blended, stuffed, and check-weighed.

9 **LIFT TRUCK** and pallets increase capacity of aging room.

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY
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How to simplify your ...Standardize on the

ECONOMICAL VALVES FOR

Keep Crane 25-Pound Iron Body Double services that don't require the usual 125- 25 Pounds Steam or Gas, and up to 50 Po on size, they give superior service in a v tions. Use them inside or out; their oval-s have ample reserve strength under line st pact, they take minimum space in pipe li

For durable, tight seating—yet easy op disc faces are brass. Crane 2-piece ball-ty form pressure on packing; prevents bind packing life. When specified, these valves by-pass, and clean-outs; also can be moto non-rising stem, flanged or hub ends, up t with flanged ends only up to 48-in. See your

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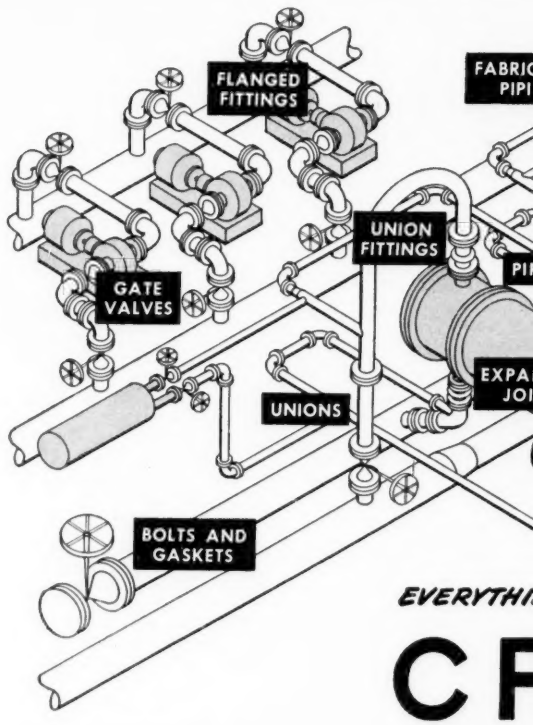
CIRCULATING, COOLING AND SERVICE WATER



EVERYTHI

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VALVES • FITTI

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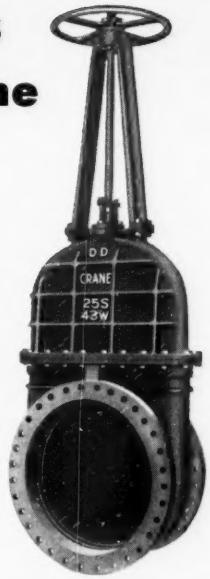

OR LOW PRESSURES

ouble Disc Gates in mind for 125-Pound valves. Rated at 50 Pounds Water, depending n a wide variety of applica- val-shaped body and bonnet ine stresses. Short and com- ipe lines.

asy opening—seat rings and all-type gland maintains uni- binding on stem; lengthens alves can be fitted with gears, motor or cylinder operated; , up to 36-in.; O.S. & Y. type e your No. 49 Crane Catalog.

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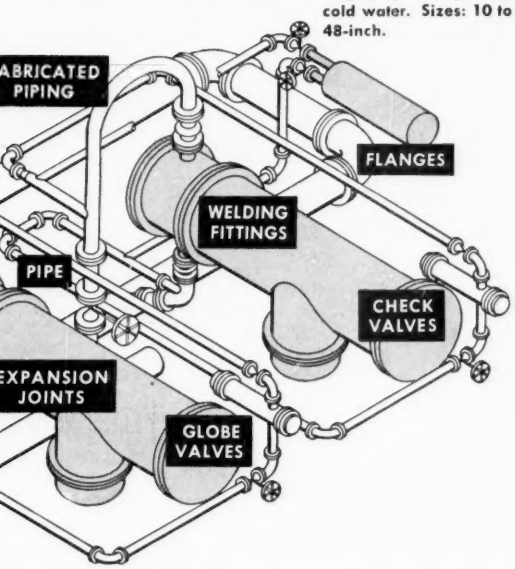
No. 793½, Outside Screw and Yoke. Working Pressures: 25 pounds steam or gas; up to 50 pounds cold water. Sizes: 10 to 48-inch.



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RANE

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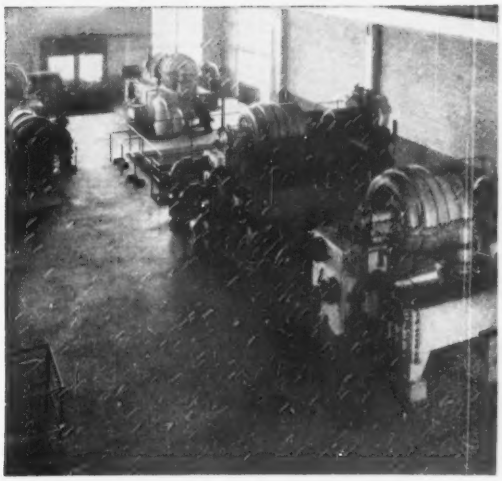


No major overhaul in 20 years

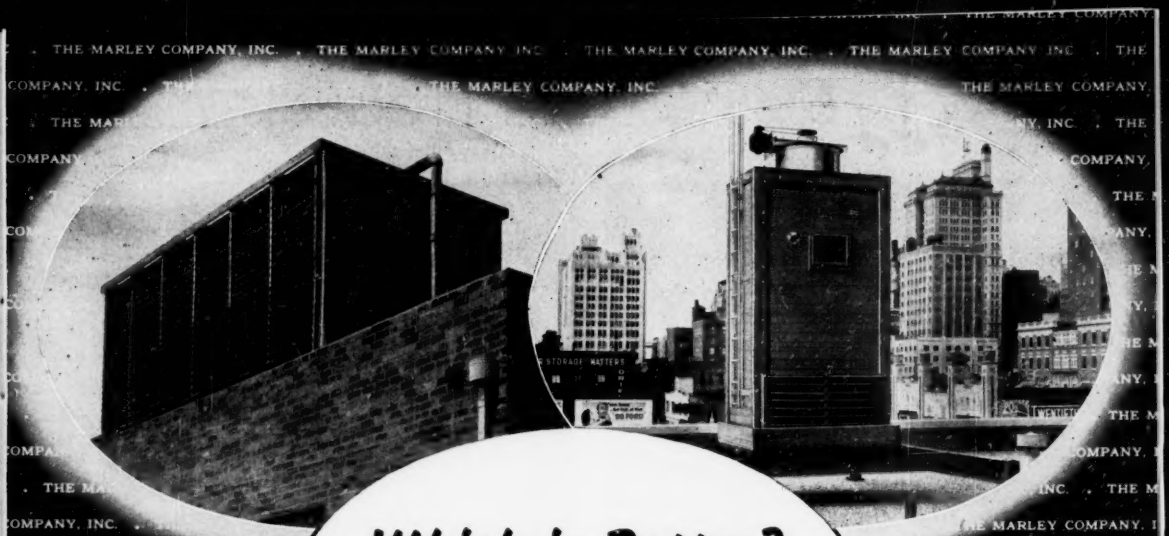
The two 200-ton Carrier Centrifugal Refrigerating Machines up front in the photograph cool water to 37 degrees F. for W. F. Schrafft & Sons Corporation, makers of fine chocolates. The two 75-ton machines at the rear cool brine to a temperature of 15 degrees F.

These machines and one other were installed in 1928. Not one compressor has needed anything but inspection and maintenance at bearings, shaft seals, and minor wearing parts.

That's what we mean by "minimum maintenance." And Carrier Centrifugal Refrigerating Machines are setting records for dependable operation in scores of meat packing and food processing installations.

The Carrier Centrifugal Refrigerating Machine is available in capacities up to 1200 tons. It will attain temperatures as low as minus 100 degrees F. It can save you money on installation, operating and maintenance. See your Carrier engineer or distributor about any refrigeration problems. Carrier Corporation, Syracuse, New York.

Carrier **Air Conditioning • Refrigeration • Industrial Heating**



Which is Better?

SERIES 200 - VAIRFLO

Natural or Mechanical Draft

IT'S all the application—they're both the best of their type in quality and in price. Let your Marley Application Engineer show you how to get the best one for your specific job. He will show you how to evaluate first costs — operating cost — wet bulb requirement — driftage — horsepower—pumping costs—wind velocity—fire codes, and many other important factors. Mechanical Draft or Natural Draft—Marley VAIRFLO or Marley Series 200 —you know you are getting the most for your dollar.

VAIRFLO . . . a Mechanical Draft tower from 40 to 750 tons of refrigeration that includes many extra quality, heavy duty features formerly found only on large, industrial cooling towers. Because they are mass produced, these extra quality features are standard on the Vairflo at no extra cost. These features include totally enclosed motor, lifetime nail-less filling, Marley designed cooling tower fan, grease packed enclosed bearing housing, balanced spray nozzle distribution system, extra heavy framing and bracing, complete basin fixtures, available in redwood or steel or with an asbestos-board casing. Bulletin V-50.

Series 200 . . . a Natural Draft cooling tower COMPLETELY PREFABRICATED and piece marked with full erecting, operating and maintenance instructions. Made from heart quality surfaced redwood. Has Marley nozzles in a balanced spray system, machined louver posts, slip-fit louvers, complete basin fixtures, including sump and float valve, and is braced with heavy diagonals. Bulletin 200-50.

Take advantage of the Marley man's "know-how." Let him analyze your water cooling problem and make a good sound recommendation. He will be glad to help you at no cost or obligation.

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The Marley Company, Inc., Kansas City 15, Kansas

- ☐ Bulletin V-50 ☐ Bulletin 200-50
- ☐ Please send FREE copy of "What's Your Cooling Tower I. Q.?" Illustrated folders available on Cooling Tower Operation, Maintenance, Water Treatment, Testing, Specifications.
- ☐ Have Marley Application Engineer call.

FI-7

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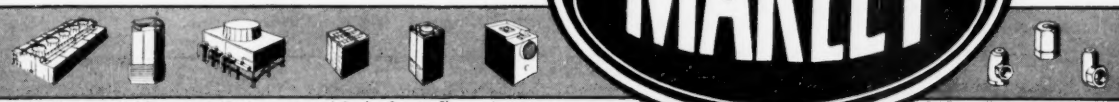
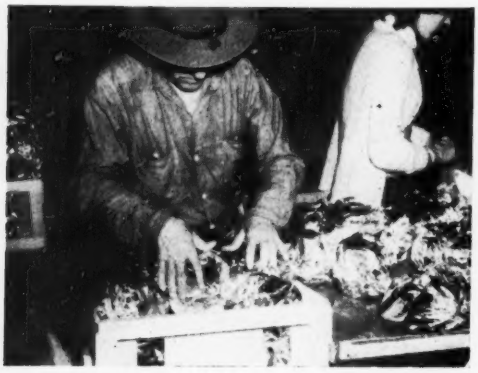
MARLEY



Double-Flow Vairflo DriCooler Natural Draft Counter-Flow Aquatower Spray Nozzles

New Packages and Products



Cauliflower wrapped and crated

Asparagus cartoned and overwrapped

Foil-Wrap Cauliflower, Test Asparagus Prepackaging

■ Prepackaging continues to make forward strides. Newest items are aluminum foil-wrapped cauliflower and cardboard-cartoned asparagus. Here are the details:

Aluminum Sheets Protect Cauliflower A

During the last 'flower' season, Joseph Cunha, of M. S. Cunha & Co., Salinas, Calif., pioneered wrapping of individual cauliflower heads in aluminum foil. He wanted to increase saleability so as to command a premium price. Reaction from 6,000 crates sold has prompted company plans to foil-wrap exclusively.

Because the wrap permits more of the guard leaves to be cut away, from 24 to 32 cauliflower heads may be packed in the conventional 42-lb. "pony" crate, instead of the usual 11 or 12 heads. Freight savings reach 65 percent (though this does not apply to cauliflower prepackaged in parchment).

In the packing shed, cauliflower is handled in the conventional manner, up to wrapping, except that only one layer of leaves is left around the curd. Stock of 16-in. square, .0008-in. thick, aluminum foil sheets is kept in front of wrappers. They place head in center of sheet, flower up, and fold corners over the top of cauliflower. Heads are crated in two layers, with a paper cushion between. A new type of crate, with center dividing tray, is being investigated.

Kaiser Aluminum & Chemical Sales, Inc., Oakland, was agent for Cunha in the foil-wrap program.

Prepackaged Asparagus Fresh, Tender B

During April, a test shipment of asparagus, prepackaged in cardboard trays overwrapped with Lumarith film, arrived in New York tender, full-flavored and still fresh, after five days enroute from California. Next day, the whole load, over 800 1-lb. packages, was sold in a Manhatten self-service store.

The successful shipment and good consumer reaction indicates that asparagus prepackaging will be adopted as a permanent operation.

The Atlantic Commission Co., produce-buying affiliate of A & P, conducted the test. Its Stockton, Calif., plant prepackaged 30 1-lb. bunches of asparagus into the usual pyramid crate and shipped 27 of them to New York in express cars. Bumper ice cooled the cars, the asparagus being held at 41 deg. F. at top and 38 deg. F. at bottom.

New York car inspectors were enthusiastic over the handling method, since they saw less chance of tender tips being damaged in transit.

Add Icing, Cake's Ready C

Latest innovation in the baking field is a cake which is fully baked, hence needs only to be frosted before serving. It's named "Frost 'n' Serve" by the maker, American Lady Bakeries, Denver.

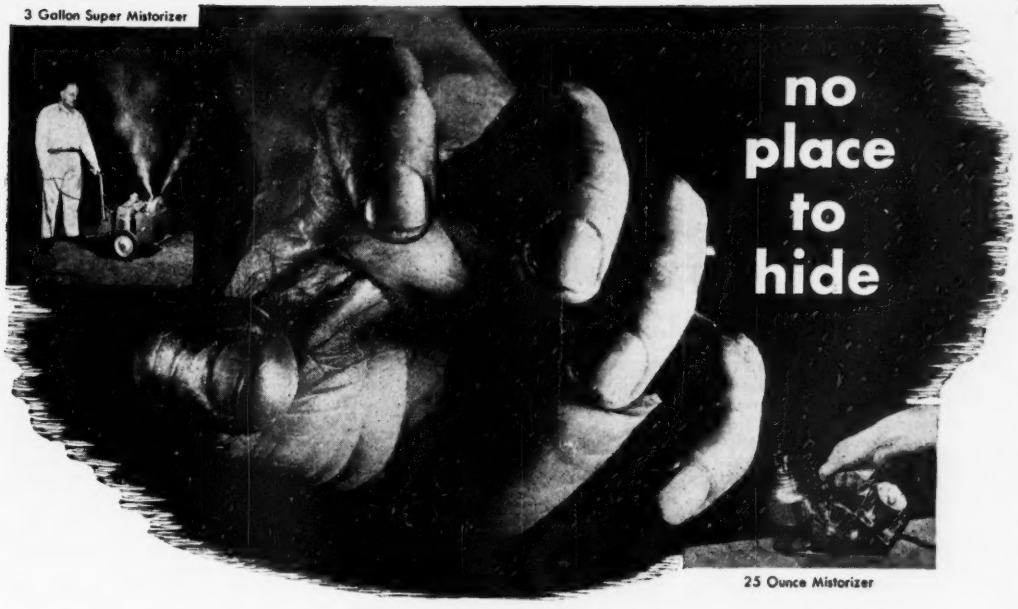
The shortening in new cake is butter. Emulsifier, "Tru-Flo", is supplied by Haehmeister Inc., who also helped develop formula.

Two 8-in. layers, with paper liner between, are packaged in cardboard box with cellophane window. Recipes for different varieties of frosting are printed on bottom of carton.

Consumer interest in the butter cakes has already resulted in increased sales, according to Harold Carpenter, company president and developer of formula.

Want More Information?

It's free—and easy to get. Say, for instance, you want added details on the item marked "B" here on page 110. Simply flip to one of the special Reader Service postcards inside the front cover and circle 110B. Sign at the bottom and mail—no stamp needed. Then the extra information will be on its way to you.



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53

WORTHINGTON REFRIGERATION REPORT

WORTHINGTON PUMP AND MACHINERY CORPORATION
HARRISON, NEW JERSEY

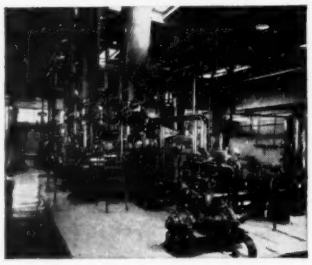
Specialists in air conditioning and refrigeration for more than 50 years

Ice-Making Fuel Cost Reduced by 40%

The Pacific Fruit Express Co. has an ice manufacturing and storage plant at Tucson, Ariz. for servicing perishable produce shipped by rail. This plant operates 24 hours per day and has a capacity of 250 tons daily during the peak season. They can ice 160 cars, 80 on each side of the platform in one spot.

The Worthington LTC-4 Gas Engine-driven Compressor installed at this plant is more economical than the steam-driven compressor it replaced, having reduced fuel cost by 40%.

The Worthington Compressor was installed in April, 1948, and is used for recirculation of ammonia gas in refrigeration plant. This 500 hp, 300 rpm machine runs an average of seven months per year, 24 hours per day and has given trouble-free operation.



Main engine floor showing Worthington LTC-4 Ammonia Compressor driven by a Worthington gas engine.

Nothing Too Good for the Pigs

John Morrell & Co.—one of the largest pork meat producers in the world—has always been alert to technical progress. It was the first to wrap hams in parchment paper, first to pack lard in paper cartons, one of the first to install the revolving smokehouse.

When the company decided to increase the general refrigeration capacity of its plant at Ottumwa, Iowa, Worthington equipment was selected on the basis of favorable comparative operating cost figures.

That was over ten years ago, and the Worthington two-stage ammonia compressor is still operating in a highly satisfactory manner, in respect both to operating cost and absence of trouble.

Cold storage room at John Morrell & Co.'s Ottumwa plant.

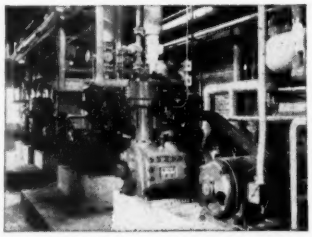
This compressor operates 24 hours a day with shutdown only during the coldest month for annual overhaul. It provides refrigeration for both freezing and storage (0 to 15 F).

Fully Automatic Refrigeration for First National Stores

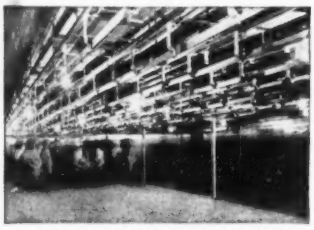
About 300 stores of the vast northeastern network of First National Stores are served by the warehouse in East Hartford, Conn.

This warehouse has recently been expanded by the construction of refrigerated compartments for banana ripening, meat storage and assembly, and cooling of pork products, corned beef and chicken.

A fully automatic system of refrigeration has been installed. It produces about 80 tons of refrigeration, and includes the following Worthington equipment: four 7 x 7 ammonia compressors, two 16 x 12 condensers, one 12 x 9 condenser, two 16 x 16 brine coolers, one 12 x 9 brine cooler.



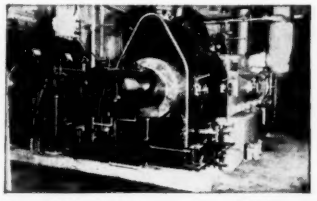
Four Worthington 7 x 7 VSA ammonia compressors. Condensers in background, brine coolers overhead.



Meat storage room—part of new addition to East Hartford warehouse of First National Stores.

There are two levels of brine refrigeration, one at minus 15 F, one at 12 F. Defrosting is done by hot brine in rooms served by pipe coils and by water in rooms served by product coolers.

Architect: Ganteaume and McMullen, Boston. Installation by Harding and Gross, Cambridge.



Type ODU Uniflo steam-driven Worthington ammonia compressor.

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AIR CONDITIONING AND REFRIGERATION

A complete line . . . in which *all* the vital components are *made*, not just assembled by Worthington. For more worth with Worthington, see your nearby Worthington distributor (consult Classified Telephone Directory).

Dutch Food Imports A

The recent Holland Fair, held in Gimbel's Philadelphia department store, exhibited a wide assortment of products that Dutch manufacturers want to introduce in the U. S.

Pictured above are nine of Holland's best selling food products, some of which are already on the American market. At bottom left are the "Famous Dutch Sprits" cookies. As seen here, these cookies come wrapped in parchment liner and enameled metal container. Then comes brown kraft paper laminated to the printed label stock and a Pliofilm overwrap finishes the job.

Next in line are "Peijnenburg's Crick-Cracks", made of flour, sugar, honey, orange-peel, spices, flavoring and baking powder. Gouda process cheese completes bottom row.

From left to right at top are: Canned cookies (½ lb.) called Rosetta's; can (3 lb.) of 10-in. white asparagus tips; a full-flavored 7½-oz. chocolate drink made of milk with cocoa and sugar added; Dutch rusk in a cardboard cylinder; berry flavoring syrup with 0.03 percent benzoic acid and flavor added; and finally oat flakes.

Live Lobsters in a Can B

In Boston, Live-Pak Seafoods, Inc., is now packing two live chicken lobsters in a #12 can. Average life expectancy is from 6 to 16 days when kept under normal refrigeration (40 deg. F.). Can contains 1 lb. of ocean water, oxygen, company's process water, and material to absorb waste products.

Plastic Bag for Beer C

Newest beer-can carrier is this polyethylene bag used by the La Crosse Breweries, Inc., La Crosse, Wis. Production of 10,000 six-can units a day tops previous year's output. Company attributes increased sales to new package.

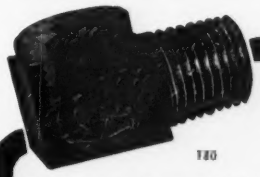
Vanant Products, Inc., Milwaukee, fabricates the plastic bag by heat sealing the film to a polyethylene coated cardboard header. Visking Corp., Terre Haute, Ind., supplies 'Visqueen' tubing in 14-in. flat widths (gusseted to an 8½-in. face) and .0015-in. thick.

The beer company fills four bags at a time in a 24-can packing machine. Cans rest on a cardboard base insert.

Firm reports the "bugs" that had to be ironed out. A heat-sealed header

DO YOUR SPRAYS CLOG?

Advanced design features a single round tangential inlet (instead of several small slots). Relatively large solid particles can pass right through and out the orifice. Produces a hollow cone spray with fine break-up and even distribution—ideal for many types of applications.



Available in Brass, Stainless Steel and Hard Rubber—or made-to-order in any machinable material. ¼" to 1" I. P. S.

In many Food Processing plants Monarch Spray Nozzles are used to . . .

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Remember

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2 they're WOVEN TIGHTER

WOV-IN-WEAR is a unique belt weaving process that is our own EXCLUSIVE development. Drawing from our more than half-century of experience, we have perfected a new type of loom that permits us to weave under HIGHER TENSION to produce belts that can really "take it."

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Yes, Buffalo belts are pretty "spry" in their old age because you can't beat the combination of TOUGHER yarn and TIGHTER weaving. But, you don't pay a cent more for Buffalo's EXTRA margin of service. And . . . when you decide on a Buffalo Conveyor Belt you needn't be satisfied with a makeshift selection because Buffalo offers you a line that includes OVER 200 SIZES and six special treatments.

OVER 200 SIZES 35 WIDTHS 7 THICKNESSES

BUFFALO WEAVING & BELTING COMPANY

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NEW YORK PHILADELPHIA CHICAGO DETROIT SAN FRANCISCO

was adopted after discard of both adhesive-attached and stitched-on headers. The original bag was lengthened 1 in. so the header could fall over and lie flat when four bags were automatically sealed in a mother carton. And finally, since the bag is air-and-water tight, wet cans coming from the pasteurizer rusted after standing awhile. The cans are now dried by air jets placed between the pasteurizer and packer.

Fresher With "Poly" A

Unveiled at the recent National Packaging Exposition in Chicago were these paraffin wax wrappers, incorprating polyethylene resins, for bread and similar foods. Added freshness and brighter sales appearance are called the big improvements.

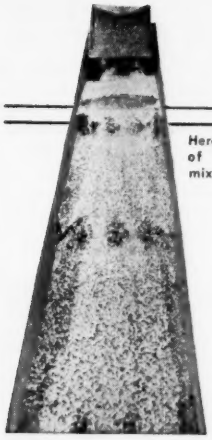
The plastic resin increases strength of the heat-sealed bonds, which help keep moisture and flavor inside. Package appears glossier, and the coating gives greater protection against scuffing and abrasion.

Pollock Paper Corp., Dallas, manufacturers the bread wrapping paper, while Bakelite Div., Union Carbide & Carbon Corp., New York, furnishes the polyethylene and wax.

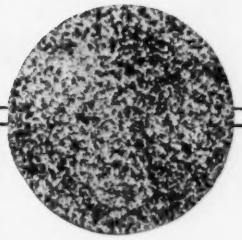
Observers believe bread in polyethylene shows promise.

Cheesecake in Foil B

Sara Lee cheesecake is being introduced to New York housewives, packaged in pint-size one-piece aluminum

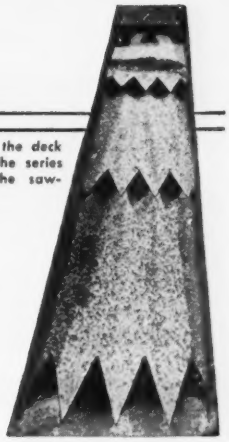


Here you can see the action of two materials being mixed as they are conveyed



This magnified view shows a mixture after being conveyed only 8 feet.

Here you can see the deck construction and the series of steps. Note the saw-tooth edges.



Interested in

MIXING · DRYING · COOLING?

Then you'll want to know more about this Jeffrey-Traylor patented Mixer or step type of Conveyor. Look at the photos — note the series of steps with saw-tooth edges. The material passes over these steps, the side slip discharge causing an intermingling of particles — turnover being partially or completely effected. Material is thoroughly mixed — even to two or more different materials.

This type of unit is especially good for conveying material being treated with infra-red or ultra violet lights — has been used on indirect dryers and coolers to increase the heat transfer. Highly effective and essential in roasting or toasting processes — possible to produce uniformly toasted material (throughout the bulk) when other methods have failed.

We will be very happy to tell you more about this process and what it can do for you. Give us an opportunity to go into detail.

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Dryers
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Barrel Packers
Packing Tables
Bin Valves
Bin-Level Controls
Waytrols

A section of a step-type Mixer Unit used as a direct dryer or material mixer. See list at the left for other Jeffrey-Traylor electric vibrating equipment. Then write for Catalog No. 804 which goes into detail.

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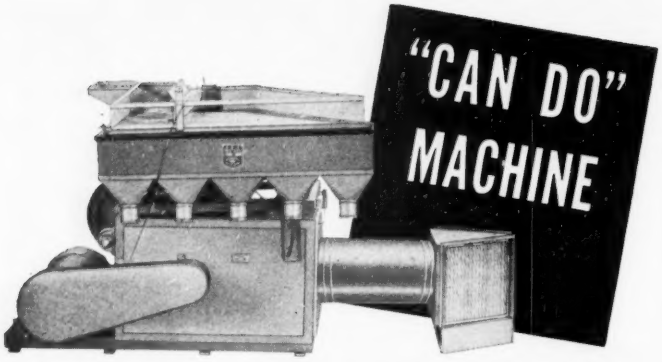

Sutton's Specific Gravity Separators and Air-Float Stoners passed the "know-how" stage a long time ago. (Over sixty years of specialized experience in solving dry separation problems now goes into every machine shipped.) Their adequate performance in the food processing field – cleaning and up-grading raw materials and end products from sub-grade to high-purity premium quality, and reducing handpicking operations *as much as* 85%, is a generally accepted fact throughout the industry.

Sutton's Separators and Stoners answer adequately all basic specifications required of any type of processing plant equipment—with performance to spare.

1. They will improve your product.

2. They will earn you more profit.

3. They are easy to operate and economical to maintain.

If you are interested in taking a basic step toward economical process and product improvement without increasing overall expenses, write for instructions on how to submit a small sample of your product for a free preliminary test and analysis for separation, or use the coupon printed below.

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Please forward instructions on how to submit a small sample of our dry commodity for a preliminary survey.
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containers, made by Reynolds Metals Co., Richmond. National distribution is planned.

Made with cream cheese instead of pot cheese, graham crackers for the crust, and cream for topping, the cheesecake is baked, sold, and served in the aluminum package. Customer keeps it in refrigerator until served.

The aluminum container was chosen because it is moistureproof and does not impart any flavor.

New Ice Cream Pack A

Smaller versions of its linerless ice cream cartons have been test-marketed by Marathon Corp., Mensaha, Wis., and Ex-Cell-O Corp., Detroit, designer of a pilot model automatic packaging machine.

Sizes for the easy-opening packages range from 3.2 to 6 oz., all of which can be packaged on the same machine. Two types are available: (1) For eating direct from the box, spoon attached; and (2) for measured portion use, without spoon.

Although designed chiefly for take-home and concession markets, soda fountain and restaurant managers like the idea of portion control, which gives them accurate cost data.

The "spoon-in" version is adaptable to vending machines.

Package and Product Shorts

Concentrated (Unfrozen) Prune Juice B

A 5¼-oz. lithographed can of concentrated prune juice, reconstituting to 1⅛ pints (4-to-1), is announced by Richmond-Chase Co., San Jose, Calif. Tradenamed "Heart's Delight," product requires no refrigeration.

Roasted and Canned Poultry C

New canning process, called "Triple-Pac" heralds new line of canned whole poultry introduced by Sell's Specialties, Inc., New York City. Poultry is flame-browned, then hand-wrapped in aluminum foil and sealed inside a vacuumized moistureproof bag before being placed in can. Chicken broth is poured into can but does not touch roasted poultry.

—*End*

"Your Package Must Protect the INTEGRITY of Your Product"

Says:
JOEL Y. LUND
(Vice President, in charge of Manufacturing and Export, Lambert Pharmacal Company)

The customer expresses faith in a product just by asking for it. He expects it to be in perfect condition, with all its vital qualities intact. The package must not fail. That's why men whose products are noted for integrity stress *protection* in packaging.

Check the sales leaders in field after field and you will find careful evaluation of packaging materials . . . and over and over again you will find Riegel papers selected for product protection. We design many special types . . . for flexible packages, for laminates, for outer wraps, for inner wraps and for almost every requirement you may have.

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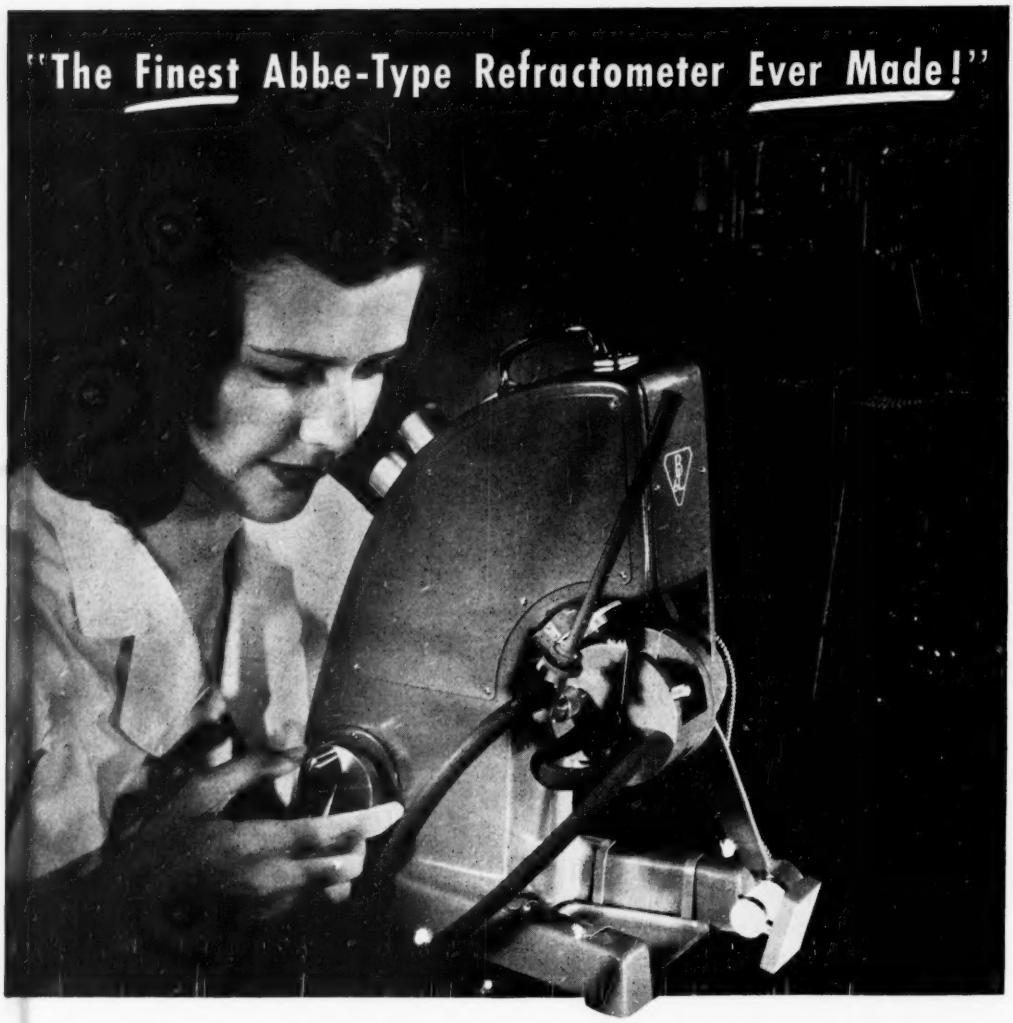

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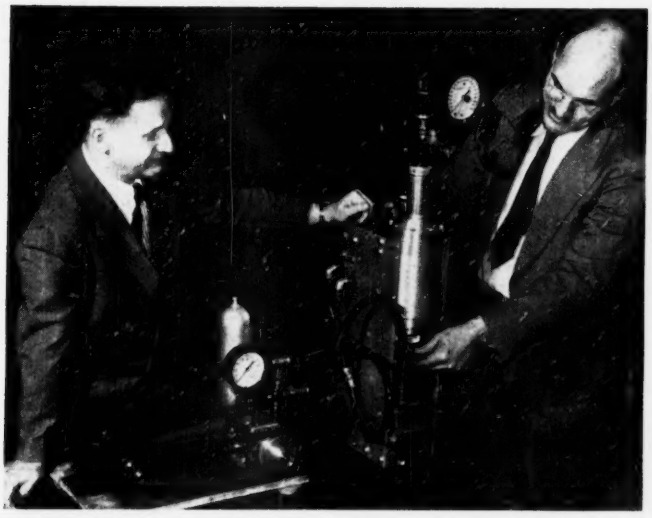
WRITE for complete information and a demonstration to Bausch & Lomb Optical Co., 603-S St. Paul St., Rochester 2, N. Y.

Bausch & Lomb "Abbe-56" Refractometer

New Technology



THIS "MECHANICAL UMPIRE" tests produce in field or plant.

High Precision Miniature Tenderometer Measures Quality of Fresh Vegetables

Higher quality canned and frozen vegetables are expected to result from use of a new "mechanical umpire" (shown above) designed by specialists at the University of Maryland Agricultural Experiment Station, College Park, Md.

The instrument, a miniature tenderometer, is used to measure objectively the quality of raw peas, sweet corn, and other vegetables. It uses two principles in its action: With peas, a series of steel bars shear through a sample of the shelled peas. The force necessary to cause this shearing is measured and the greater the force, the less desirable the peas. For sweet corn, a weighed sample of kernels is squeezed for 3 min. at 500 psi. The amount of juice extracted indicates the succulence and, therefore, the quality of the corn.

The unit is portable and relatively inexpensive. At the same time it is said to be easily calibrated and standardized and reported to have high degree of precision. With it, factory field men or growers can determine the optimum time for harvest to insure maximum yield and quality; inspectors and quality control men in canneries can predict the quality of canned food; and inspectors and consumer representatives can test raw vegetables in the market or retail outlet.

Digest from "University of Maryland College of Agriculture Extension Service" release, Mar. 23, 1950.

Sulphur Dioxide Uptake Cited for Citrus Juices

On addition to fruits or fruit juices, SO_2 combines with some of their components. In order of importance these are: Glucose, aldehydes and ketones, pectins, and possible pectin breakdown products such as arabinose.

The combination of SO_2 with glucose increases with glucose concentration in both pure solutions and in orange concentrates. Since more SO_2 combines with orange juice than the sugars can account for, aldehyde and ketone-like bodies (some present in the original juice, others formed during processing) are responsible for part of this uptake. Amino acids increase SO_2 combination, but to a much lesser degree than they promote browning of a sugar-amino acid mixture.

Slight increases in temperature cause orange juice to combine more freely with SO_2, in contrast to the effect of temperature on its uptake by pure glucose solutions. The effect of pH is much more irregular for orange juice than for pure sugar solutions, though juices of low pH tend to combine with SO_2 to a lesser extent than juices of high pH.

Sulphiting of juices to prevent fermentation should be done at elevated temperatures to promote killing of the organisms, and should be followed by cooling to inhibit SO_2 combination, with loss of antiseptic power. Sulphuring at low pH will also help to prevent loss of SO_2 due to its combination with juice components.

Digest from "Combination of Sulphur Dioxide With Concentrated Orange Juice. I. Equilibrium States" by M. Ingram and K. Vas, *Journal of the Science of Food and Agriculture*, Vol. 1, No. 1, 28-34, Jan. 1950, and "II. The Rate of the Reaction," Ibid, Vol. 1, No. 2, 63-66, Feb. 1950.

FATS AND OILS

Metallic Contaminants Nullify Antioxidants

Increasing interest in the effect of metallic contaminants in fats and oils, and methods of preventing such contamination or rendering the elements ineffective has led to further investigations on metal deactivation in lard. Experiments were conducted to determine the effect of copper, iron, nickel, and tin on the oxidative stability of lard. A number of compounds were evaluated for their metal deactivating

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Outstanding powerful quaternary. Sustained bactericidal action. For deodorizing and disinfecting in food plants.

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power alone, and in combination with antioxidants. The following concentrations of metal were used, expressed in ppm.: Cu 0.2, Fe 2.0, Ni 2.0 and 4.0, and Sn 20.

Influence of known antioxidants on lard containing these amounts of metals was determined. In every instance the effectiveness of the antioxidant was markedly lessened by the metal, although in some cases appreciable antioxygenic effect remained. It is unlikely that the antioxidant deactivated the metals because when some of the antioxidants were added in 0.02 percent concentrations in the presence of metal, the increased stability was not equal to that obtained when 0.01 percent of the antioxidant was added without the metal.

Synergists also were added to lard containing the metals. Ascorbic acid, l-ascorbyl palmitate, and potassium l-ascorbyl palmitate produced substantial recovery from the effects of added Cu, but the first two were ineffective against Fe; the third was effective against Cu, Fe and Ni.

Amino acids and amines also were tested as deactivators, but none were effective.

Digest from "Metal Deactivation in Lard," by S. G. Morris, J. S. Myers, Jr., Mary L. Kip and R. W. Riemenschneider, *Journal of the American Oil Chemists' Society*, 105-7, March, 1950.

BAKING

Waxes Prevent Bread Staling

Bread staling has been delayed, resulting in a loaf retaining good eating quality for 14 days or more, by adding a mixture of paraffin and beeswax to the flour. Admittedly, this is contrary to good nutrition, since paraffin has no food value and may have an adverse effect on vitamin A absorption. But it can be useful for short periods under field conditions where the morale value of "fresh" bread is very high.

The most useful mixture was 3 parts paraffin (setting point 122-140 F.) plus one part beeswax, melted together and blended with flour—28 parts of mixed wax to 72 parts of flour. The wax-flour mixture was used in the doughs at the rate of 4 lb. to 140 lb. flour. Finished bread thus contained about 0.4 percent wax. Ceresin and ozokerite were almost as good as the paraffin-beeswax mixture, but paraffin alone, or other waxes, were less effective.

Bread baked with the wax mixture in the dough actually loses less moisture on storage than other breads, and it retains its good eating qualities up to 21 days or more. The beeswax appears to supress grittiness and granularity; bread containing it never lost the quality of creaming in the mouth.

For use under tropical conditions, addition of acid calcium phosphate and calcium propionate to the mixture acted as a rope preventive. The mixture contained 3 lb. of flour, 1 lb. of mixed wax, 1 lb. acid calcium phosphate, and 2 oz. of calcium propionate. It was used in doughs at the rate of 5 lb. per 140 lb. of flour.

Digest from "A Method for Improving the Keeping Quality of Bread," by R. S. Alcock and J. King, *Journal of the Science of Food and Agriculture*, Vol. 1, No. 1, 14-17, Jan. 1950.

PACKAGING

Leak- and Siftproof Folded Package

Providing tight and liquid-proof flexible closures for tubular cartons of conventional construction is the basis of a patented package. Such containers are usually formed from blanks of cardboard, and have open ends and closure flaps. In applying the invention the carton is set up in any suitable manner, and one end is completely sealed by a flexible membrane. This is rectangular in shape and of suitable dimensions to close the open end of the container and partly overlap the closure flaps. Heat and pressure are applied to the membrane through an expansible head, so as to seal the marginal portions to the closure flaps, as well as the depressed portions to the inner faces of the side walls of the carton. When the sealing membrane is shaped and sealed into the end of the carton, the closure flaps are folded and sealed. The membrane may be made of coated kraft paper, cellophane, ethyl cellulose, cellulose acetate, rubber hydrochloride, wax-rubber films, and films of vinylidene chloride, copolymers of vinyl acetate and vinyl chloride, and the like.

Digest from U. S. Patent 2,496,043, issued Jan. 31, 1950, on an application dated July 26, 1946, to R. A. Farrell, Menasha, Wis., assigned to Marathon Corporation, Rothschild, Wis.

Aluminum Bottle Cap

A novel bottle closure that requires no special opener has been invented to take the place of the usual type cork-lined crown. A metal guard ring, holding a rubber gasket, is forced over the shoulder of the bottle that normally would hold the crown in place. A soft aluminum or other metal cap is inserted in the ring and pressed into the edge of the rubber gasket by rotating pressure. The result is an internal groove in the cap that presses

into the edge of the rubber gasket to form a seal by squeezing the gasket between cap, guard ring and bottle mouth.

The gasket and guard, or holding ring, are said to be good for a minimum of 600 closures, far more than the normal life of the bottle. The mouth of the bottle is protected against chipping and breakage by the guard ring. Parts fit tightly against the mouth of the bottle and the ring of gasket material exposed to the bottle contents is so narrow that introduction of impurities is not possible.

The caps can be pried out with any sharp-pointed tool and being pure aluminum (or other metal) can be salvaged. The weight of metal per thousand closures is much less than for cork-lined crowns and no cork is required for the seal. Adaptation to the usual closing machines is possible and requires very little labor for the changeover.

Digest from "A New Bottle Closure", by H. Netz, *Die Brauwelt*, 784, Oct. 1949.

DAIRY

Homogenized Raw Milk Used In Rennet Paste

Preparation of rennet paste adapted for cheese making is the subject of a recent patent. According to one form of the process, rennet stomachs are cleaned and ground into a fibrous pulp. This is added to homogenized raw milk and the mixture allowed to stand until it has the consistency of cheese curd. The curd is cut into small pieces to facilitate separation of whey which is drained. The resulting curd is ground into a paste, 15-45 percent salt is added, and the pH is adjusted to approximately 4.6. Suitable acids are phosphoric, sulphuric, acetic, citric, lactic, and tartaric. A mixture of equal parts lactic and acetic acids is preferred. The paste may be used immediately after preparation but aging for a week or two improves it. Before using, the paste is mixed with water and allowed to stand to permit the enzyme material to dissolve, then strained, and the liquid added to the cheese milk.

Digest from U. S. Patent 2,482,520, issued Sept. 20, 1949, on an application dated Oct. 22, 1946, to E. C. Scott and G. W. McDonald, Ashton, Ill., assigned to Swift & Co., Chicago.

Fat Breakdown by Lipolysis Alters Food Products

Spoilage of natural products that have not been processed by heating is often due to enzymatic effects, that may be quite aside from any growth of spoilage organisms. Rough handling,

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These precision made casters and wheels will help you speed up production . . . will pay for themselves many times over.

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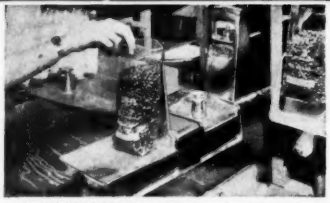
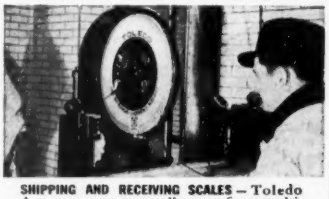


OVER-UNDER SCALES – The Speedweigh saves time in packing, filling, check weighing.



SHIPPING AND RECEIVING SCALES – Toledo Accuracy prevents small errors from multiplying into big losses!

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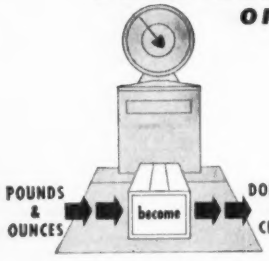

Errors made at the scale stay wrong forever. There is no chance to recheck; either the food product has been shipped or has lost its identity in the general stock. You've got to be *right* — weigh it right with Toledo!

Guard Costs with

TOLEDO *All the Way*

shaking, or bruising accelerate this action by rupturing cell walls or protective films and thus releasing the enzymes. Studies on milk have shown that higher acidity develops in a sample that is agitated, than in one that remained at rest. The difference was due to lipolysis of the fats. Skim milk that has been heated to 176 F. gives very little lipolysis with cream, while unheated skim milk gives normal fat breakdown when mixed with heated cream. Quaternary ammonium compounds inhibit lipolysis very effectively when 1 percent is used. Action of the quaternary has been shown in both milk and in suspensions of rape-seed and soy bean meals in water. The effect is an antienzymic one, and is not due to antiseptsis, since other antiseptics did not hold down the free fatty acid development even though microorganisms did not grow in the fatty foods.

Digest from "Alterations in Food Products," by Marcel Loncin, *Revue des Fermentations et des Industries Alimentaires*, Vol. 5, 15-17, 1950.

ENGINEERING

Ultrasonic Treatment Speeds Conching

Shortening the conching process in the preparation of chocolate masses, and simultaneously producing a superior product, is claimed for a recently patented invention. These objects are realized by subjecting the chocolate masses to mechanical vibration by ultrasonic waves with a frequency of about 15,000 oscillations per sec. This treatment is given during the conching operation and after preliminary treatment of the chocolate mass in roller mills. Among the beneficial effects are: Reduced particle size in suspension, higher stability of the product, more speedy polymerization, and more rapid oxidation. Better homogeneity, appearance and taste are added benefits.

Digest from U. S. Patent 2,496,557, issued Feb. 7, 1950, on an application dated Dec. 16, 1946, to Tore Nordenskjöld, Malmo, and Knut S. Holmquist, Stockholm, Sweden.

New Malting Drum

A new type pneumatic malting drum known as the Box drum, has come into use in England during the last few years. It differs from the older, Galland drum, in not having the central perforated air cylinder and the side air tubes around its periphery. Instead, a perforated floor or deck runs practically the full length of the drum about one third of a diameter from the cylinder wall. At the air inlet end, a solid bulkhead extends down to the perforated floor. At the

other, or air exit end, there is another bulkhead, which is solid below the floor, and perforated above.

By means of an air-tight door on one side, the drum is charged with steeped barley to a depth of 3 ft. 3 in. The door is then closed and the drum is given one revolution to distribute the grain evenly over the perforated floor. During the growing period of 8 days, or more, attemperated air is blown into the space below the floor and the drum is given one revolution every 12 hr. The air diffuses upward through the grain and discharges through the perforated bulkhead. Once germination starts, saturated air at 55 F. is used. It is recirculated with only about 20 percent fresh air being added.

Chief difference between this drum and the conventional type is the smooth interior that it presents. Cleaning is much easier, since the floor plates are removable and the spaces behind the end bulkheads are more accessible. The whole working of the drum is simple and requires a minimum of labor. Another advantage is that no fixed amount of barley is required to charge it, and the amount used can be adjusted to the maltsters needs.

Digest from "Pneumatic Malting" by W. Hynard, *Brewers' Guild Journal*, Vol. 36, No. 424, 60-76, Feb. 1950.

MISCELLANEOUS

Improved Refrigeration Needed On Shrimp Catching Trawlers

Quality of shrimp can be improved by freezing as soon after catching as possible, but moisture-vapor proof containers and storage at 0 deg. F. are essential to maintenance of highest quality.

Extensive studies of shrimp handling problems in Louisiana waters indicate that the shrimp are bacteriologically clean when caught, and that heading and washing by commercial shrimpers on their trawlers reduced bacterial counts by 75 and 40 percent respectively. Bacterial counts of headed shrimp stored in ordinary ice in the lowest layer of bins on a trawler for 7-10 days increased steadily to above 1,000,000 per g. Use of ice containing 0.05 percent chloromine T and sodium benzoate did not decrease the number nor diminish the rate of bacterial multiplication. Storage of washed headed shrimp in waxed cardboard cartons packed in ice resulted in the best product bacteriologically, but black or dark spots developed at the edges of shell segments.

When frozen within 3 hr. after catching, shrimp maintained their high quality during a 12-month storage at 0 F. When iced on the trawler

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STERLING ROCK SALT
BRINE DELIVERED BY PIPE
TO EVERY POINT IN YOUR PLANT
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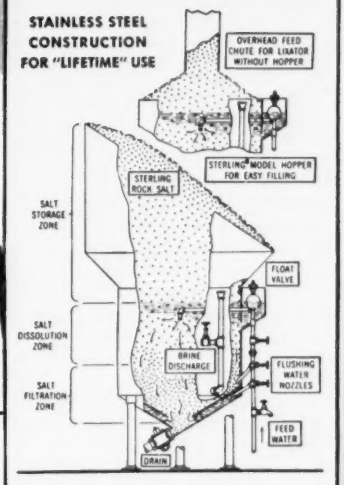
STAINLESS STEEL CONSTRUCTION FOR "LIFETIME" USE



HOW LIXATOR WORKS

In the dissolution zone—flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. In the filtration zone—through use of the self-filtration principle originated by International, the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

WHAT THE LIXATOR PROVIDES

✓ Chemical and bacterial purity to meet the most exacting standards for brine.
✓ Unvarying salt content of 2.65 pounds per gallon of brine.
✓ Crystal-clear brine.
✓ Continuous supply of brine.
✓ Automatic salt and water feed to Lixator.
✓ Inexpensive, rapid distribution of brine to points of use by pump and piping.

Savings up to 20% and often more in the cost and handling of salt have been reported by many Lixate users. Why not investigate?

• Say good-by to "guesswork" and bother! You can eliminate shoveling, hauling, and laborious hand stirring of salt and water—with International's Lixate Process for Making Brine. Assures accurate salt measurement every time. Stops waste through spilling. Saves time and labor.

• The Lixator *automatically* produces 100% saturated, free-flowing, crystal-clear brine which may be piped to as many points in your plant as you wish—any distance away—by gravity or pump. YOU SIMPLY TURN A VALVE to get self-filtered LIXATE Brine that meets the most exacting chemical and bacterial standards.

An INTERNATIONAL Exclusive

The LIXATE* Process

FOR MAKING BRINE

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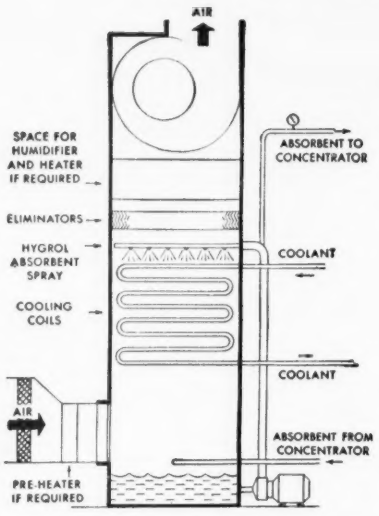
INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

New Method Gives Precise Control in Air Conditioning

Niagara "Controlled Humidity Method" Uses Hygrol, Hygienic Liquid Absorbent

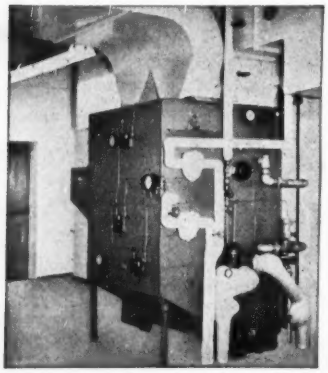


NIAGARA CONTROLLED HUMIDITY METHOD — FLOW DIAGRAM

● The Niagara "Controlled Humidity Method" is a new system of air conditioning giving complete control of temperature and relative humidity, holding constant conditions or varying them at the will of the user. Especially, it provides dry air at normal atmospheric temperatures with little or no refrigeration required. A condition of 15 grains of moisture per pound of air at 85 deg. F. dry bulb temperature has been produced without refrigeration.

The apparatus is enclosed in a casing thru which the air is drawn by fans. The air is filtered and then enters a chamber where it is dehumidified in passing thru a spray of "Hygrol" Liquid (a hygienic hygroscopic chemical that absorbs the air-borne moisture and contains no salts or solids to precipitate) In the same chamber are located cooling coils which remove the latent heat of evaporation and also sensible heat as required.

The absorbent liquid spray falls into a tank at the base, where it is piped to a concentrator, removing moisture taken from the air. The re-concentrated liquid returns to the system. This process is continuous, and the apparatus operates at full capacity at all times.



The same equipment may be used to provide winter air conditioning when required, by installing a tempering coil at the outdoor intake, an humidifier, and a reheat coil above the eliminators.

This equipment is manufactured in a range of sizes providing from 1000 to 20,000 CFM of conditioned air from a single unit, and mutiple unit installations are practical. It is expected that, by reducing the need for refrigeration, the cost of air conditioning will be reduced by this method. Applications generally are in a temperature range from 35 deg. F. upward. Below the freezing temperature of water, the Niagara "No-Frost" method is applicable.

The equipment is protected by U.S. and foreign patents. Installations have been made in food and chemical process industries, in packaging hygroscopic products, for preventing condensation of moisture on metals and other products in storage, in air conditioning for laboratory control and for human comfort.

For further information, write Niagara Blower Company, Dept. **FI,** 405 Lexington Ave., New York 17, N. Y.

ADVERTISEMENT

quality of the frozen shrimp decreased in direct relation to the length of time in the iced bins—after 12 months frozen storage shrimp held 9 days in ice before freezing contained more than 1,000,000 bacteria per g., whereas those frozen immediately after catching had 22,000.

Most satisfactory freezing temperature was —40 F. For packaging, one-piece telescope waxed cartons were used. Half of the samples were glazed after freezing and the remainder were overwrapped with glassine. No significant differences were shown between the two methods of packaging. Storage at 0 F. was practically as satisfactory as at —40 F.

Two studies were made on the keeping quality of frozen cooked shrimp. The most satisfactory products resulted from quick cooking with a minimum of salt, and frozen storage for less than 3 months when peeled, and less than 6 months when unpeeled. Shrimp frozen in cocktail sauce became tough and rancid within 5-6 months, and the tomato-containing sauces lost their red color within 5-6 months.

Digest from "Shrimp Handling and Preservation," by E. A. Fieger, M. Green, H. Lewis, D. Holmes and C. DuBois. *Refrigerating Engineering*, 244-47, 286-87, March, 1950.

Disposal of Cannery Waste By Anaerobic Treatment

Mixed tomato and lima bean wastes from an Indiana cannery were treated in an anaerobic digestion pond and four storage lagoons for the entire 1949 season (52 days) without development of objectionable odors. B.O.D. reduction through the digester was 39.8 percent, and over-all reduction averaged 94.2 percent.

All wastes were passed over 16-mesh vibrating screens and thence to a small settling pond (digester) holding approximately 475,000 gal. (Raw waste flow averaged 160,220 gal. per day.) This pond contained about 2 ft. of sludge, from previous seasons, which acted as initial seed. Continuous agitation was provided by a 3-hp. "Lightnin" mixer, set on a raft in the pond. Effluent was pumped from the digester into the first of the four lagoons, operated in series, then flowed by gravity through the remaining three. Total lagoon capacity was 11,500,000 gal.

Under the conditions encountered, raw screened wastes, averaging 983 ppm. B.O.D., were reduced to 57 ppm. within the 52 day canning period.

Digest from "Anaerobic Treatment of Food Canning Wastes," a paper by R. A. Canham, National Canners Assn., presented before the 5th Industrial Waste Conference, Purdue University, Nov. 29, 1949. —*End*

ENROUTE TO LOWER FOOD PROCESSING COSTS VIA SANDVIK STAINLESS STEEL-BELT CONVEYORS

A. 1000 layer cakes per hour can be frosted and packed on this 18-inch stainless Sandvik belt table.

B. Distributing, wrapping and boxing sliced bacon on Sandvik stainless belt.

C. Top strand of Sandvik belt carries tuna to be cleaned and packed . . . lower strand returns refuse.

D. Twin Sandvik conveyors used for preparing fruit in a baby food plant.

SANDVIK STEEL-BELT CONVEYING WORK TABLES ARE THE MODERN, LOW-MAINTENANCE WAY TO HANDLE FOOD IN PREPARATION, PROCESSING, PACKING, GRADING, INSPECTION, ETC.

ADVANTAGES

● **EASY TO KEEP CLEAN**—Live steam or boiling water can be applied directly.

● **SMOOTH IMPERMEABLE SURFACE**—No place for food particles to lodge.

● **LONG SERVICE LIFE**—Inherent high strength and resistance to time and wear.

● **ENGINEERED TO FIT APPLICATION**—Lengths to meet any center distance. Type 302 or 316 stainless. With or without cooling arrangement. Standard or special work tables. Can be arranged for any worker position . . . standing, sitting or facing along the belt.

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Corn Products Refining Co.
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Cudahy Packing Co.
Curtis Candy Co.
Cushman's Sons Inc.
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General Foods Corp.
Gerber Products Co.
Adolf Gobel Inc.
Great Atlantic & Pacific Tea Co.
Hanscom Baking Corp.
Hershey Chocolate Corp.
Hygrade Food Products
Keebler-Weyl Baking Co.
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Loose-Wiles Biscuit Co.
Megowen-Educator Food Co.
John Morrel & Co.
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Receiving — The ingredients to be mixed enter the mixing chamber of drums through a chute. Note scoops which carry up and dump the ingredients as drum rotates assuring a more uniform mix.

Discharging — Throwing a lever closes the inlet and mixer is in discharging position. The completely mixed materials drop off the lifting scoops and discharge through chute without segregation of ingredients.

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Convention Reports

Candy Makers Study Management

Labor relations, economics, research and technical advances share program at confectioners' meeting

Management's growing preoccupation with the shifting labor and economic problems was apparent at the 67th annual meeting of the National Confectioners' Assn., in New York city last month.

In the field of labor relations, Cyrus Ching, director, Federal Mediation and Conciliation Service, pointed up the fact that collective bargaining is the law and management would be wise to try to make the best of it. One way to do this was to come to the bargaining table as well prepared as are the labor representatives. He also urged management to give its representatives sufficient authority to reach an agreement, which is very often a matter of give and take. He asked the confectioners to try to realize that the purpose of the meeting with the union was to reach an agreement, not to win a victory for one side or the other. It would help management to fully understand the union representative's position and not expect him to retire empty handed. "And," he added, "don't say 'no' until you have to, but when you do say it, mean it and stick to it."

Time to Check Boom

A mild and slow contraction of the business boom will set in late this year or early next year, in the opinion of Sumner Slichter, Harvard University economist. He thought the time had come to impose a few mild brakes so that the contraction could be better cushioned when it arrived. Cut out unnecessary government expenditures and postpone for a year or so some of the necessary ones, such as road building. Most important of all, he thought, would be steps to discourage the increase in private debt.

Philip P. Gott, NCA president, offered as reasons for the confectionery industry's expansion to an annual consumption of 2,400,000,000 lb., the application of science in the manufacture of candies and the adoption of modern methods of distribution.

In discussing the tariff situation, Harry R. Chapman, chairman of the board, New England Confectionery Co., and chairman, NCA, Washington Committee, said the committee is setting forth facts as to why present import duties on candy and chocolate confections should not be decreased. Under the present 14 percent import duty, there has been a 350 percent increase in foreign candy imports the first two months of this year.

Theodore Stempfel, vice-president, E. J. Brach & Sons, and chairman, NCA, Subcommittee on Sugar, reported that for confectioners who want to be manufacturers rather than speculators the sugar situation is relatively rosy compared to the puzzling chocolate problem.

Candy Research

Confectionery science, declared H. Trespar Clark, Chief Chemist, Rockwood & Co., is moving ahead through NCA research projects; annual Lehigh Conferences sponsored by the Pennsylvania Manufacturing Confectioners' Assn.; American Assn. of Candy Technologist; courses held at M. I. T. on Basic Confectionery Ingredients and Manufacturing Problems; talks at Illinois Institute of Technology for Mid-West Candy Manufacturers; and a series of talks at Temple Univ. on Materials Handling and Industrial Packaging.

Fred B. Jacobson, Entomologist, Stephen F. Whitman & Son, Inc., reported that in one plant that has instituted a fairly elaborate sanitation program, cost per pound of confectionery produced over the past 12 months was $0.008. It is probable that by changing the system of accounting and by making modifications for a minimum but adequate program, overall sanitation costs could be reduced to $0.003-$0.004 per lb. of finished goods.

According to Arthur C. Schrier, vice-president, E. J. Brach & Sons, a committee on dust explosion hazards has been formed for the confectionery industry to write codes that will serve as guides for the construction and operation of dusty and other hazardous areas.

George F. Dudik, Dept. of Commerce's Food Division reported that manufacturers' sales declined in 1949 by 12 percent from 1948, with the larger confectioners (annual volume $3,000,000 or more) suffering the greatest loss. A representative sampling of medium-size producers ($1-2,000,000 annual volume) actually showed a climb back to record 1947 levels. First three months in 1950 show 4 percent more candy (poundage) made than during corresponding period last year, although because of declining prices, dollar volume is down.

William E. Hawes, Jr., Peoples Drug Stores, called for help from the candy manufacturers. He said it is not enough to produce a product, price it, and sell it to retailers or distributors.

Edgar S. Bellis, speaking for the National Assn. of Retail Druggists (independent), mildly rebuked candy makers for their apparent lack of interest in independent drug store outlets. Granting that such outlets were a small part of the overall sales picture, he said confectioners should not disregard any sales possibilities.

J. R. Peachey, Loblaw Groceterias, Inc., urged the candy producers to: (1) Investigate use of transparent films for packaging (2) provide a practical place on package for pricing; (3) lower the number of packs per case on slow moving items; and (4) probe possibilities of a sales campaign to get chocolates out of the doldrums.

Strong interest in the ten-cent candy bar was evinced by E. F. Hinkle, president of Automatic Canteen Co. of America. With all costs skyrocketing, he felt profit margin on 5c. bar was too small, and that consumer resistance was developing against the small, often second-grade nickel bar.

Abraham Applebaum, president Abraham Applebaum, Inc. presented a case for Fair Trade. Stressing the point that both jobbers and retailers should make a fair profit, he told how steadier profits under Fair Trade would enable jobbers to hire better salesmen to sell more candy.

Labor Saving Equipment

In making the rounds of the 24th Annual Confectionery Industries Exposition at Grand Central Palace, confectioners saw machinery that featured sanitation and labor-saving. They also saw the largest representation of European-made candy machines in 15 years.

Harry L. Friend Co. featured its new automatic cream center forming machine, capable of forming 2,244 centers a min.

Package Machinery Co. displayed a new bundling machine for products that come in relatively small size packages.

National Equipment Corp., exhibited a new, high-speed, continuous vacuum cooker for producing up to 2,500 lb. of hard candy an hour. This company also

two good ways to—

BEAT THE HIGH COST OF FLAVORING

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Closely approximates the flavor of
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CARD-O-MAR
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Spice Essential Oils...perfected in the laboratories of MM&R!

AS THE MARKET in Black Pepper and Cardamom grows increasingly critical, more and more food processors are turning to MM&R's *natural* replacements — PEP-O-ROL and CARD-O-MAR MM&R. Here are two scientifically perfected oils that can be used *successfully* in place of the spices they duplicate. Yet they cost many times *less!*

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1. more economical.
2. make it possible to flavor your product uniformly.
3. cannot cause discoloration.
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5. release 100% of flavor immediately.
6. prevent introduction of rodent excreta, hair or pellets, insects or insect fragments, etc.
7. always constant in flavor value
8. easy to measure in exact quantities.
9. take up less storage space than crude spices or flavored salt or sugar.
10. decrease freight expense.
11. prevent losses due to exposure during storage.
12. easy to blend.
13. prevent overflavoring of prepared food products during shelf life.

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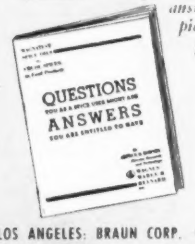

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showed a new, automatic, multi-tier cooler and packer. Also new was a Mogul machine operating at a speed of 18 boards a minute; a new, quick-change enrober made in four belt-size widths; and a new, continuous fondant-making machine that produces 1,600 lb. of product an hour and cools it to 103 deg. F.

J. W. Greer Co. came out with a continuous coating and cooling line with feed table, pre-bottomer, refrigerated cold slab, coater featuring sanitation and quick change-over, cooling tunnel, and packing table. Another unit, a stainless steel chocolate melting kettle, had removable paddles and self-adjusting scrapers.

J. M. Lehmann Co., had a new, five-roll chocolate refiner with a sight-o-matic control and a new, 450-disk conche unit.

Mill River Tool Co. displayed a new Bausman automatic starch machine incorporating many new features such as a device that accelerates and decelerates movement of trays, means to divert starch to a drier by reversing a switch, oil seals on shafts, automatic feeding of trays, and efficient equipment cleaning device.

Millers Are Optimistic

Expansion of Wheat Flour Institute activities, appointment of an advisory committee on world trade, and general review of flour milling industry conditions featured the mid-century meeting of the Millers' National Federation in Chicago, in mid-May.

Faced with a decline of 20 percent in income to carry on its long range program, initiated two years ago to promote increased use of wheat flour and increased consumption of bakery products, it was decided to discontinue consumer advertising and to merge the educational and publicity activities of the program into the activities of the Wheat Flour Institute. An increase in membership dues from $0.0013 per 100 lb. of flour production to $0.00195, effective July 1, 1950, was voted to underwrite the increased activities of the Institute.

John L. Locke, Fisher Flouring Mills Co., Seattle, retiring president of the Federation, cited the closing down of 120 mills with a daily flour capacity of 19,080,000 lb. and an export loss of 6,800,000,000 lb. of flour since 1947. This cut in milling capacity was linked to the loss in flour exports and is subject to reversal through a potential increase in exports. Mr. Locke reported an increase in flour consumption in the Philippines from 4 lb. per capita per year, prior to the war, to 22 lb. during 1949. He also said that the present consumption in Japan is 12 times that of prewar years.

In response to Mr. Locke's recommendation, the incoming president, H. W. Files, appointed Henry H. Cate, Flour Mills of America, Inc., Kansas City, Mo., John L. Locke, Fisher Flouring Mills Co., Seattle; and A. B. Sparboe, Pillsbury Mills, Inc., Minneapolis, as an advisory committee on World Trade to: (1) Study every phase of the export problem, (2) make first-hand studies of conditions in importing countries, and (3) use the information to negotiate with government officials in the U. S. and abroad.

Particular effort was made to obtain the viewpoint of young milling company executives on industry conditions.

Rogers C. B. Morton, president, Ballard & Ballard Co., Louisville, emphasized the need for keeping up with technological progress in packaging, product improvement, aggressive selling, employee relationships, and governmental, as well as industrial, leadership.

Uptrend in Consumption

John Tatum, vice-president and sales manager, International Milling Co., Minneapolis, cited the optimistic trend in total domestic consumption in contrast to per capita consumption. He thought the milling industry was in a favorable position. He ignored the production of flour for export and reported 1949 production for domestic consumption to be 20,300,000,000 lb.; equal to any year during the past 25, except during the war years. By comparison, output was 20,300,000,000 lb. in 1925; 18,900,000,000 lb. in 1935; and 20,200,000,000 lb. in 1940.

He considers industry production to be at a level where increase due to rising population balances loss due to decrease in per capita consumption. And he calls this a favorable sign. His viewpoint is based on the conviction that rise in total consumption due to increase in population over the next 30 years will be greater than the decrease due to lower per capita consumption.

Mr. Tatum does not anticipate any increase in production capacity—because of excessive building costs, interest charges, and depreciation charges. On a $3,000,000 plant recently built in western Canada, he said, interest and depreciation charges alone amount to 29c. per 100 lb. flour. Further loss of production capacity may be expected through wearing out of equipment and burning down of plants. Increased production is expected to be met by more efficient operation of existing plants. During 1949, the mills operated at 79.3 percent of 5-day capacity. During 1925 mills operated at 62.9 percent 5-day capacity; 69.1 percent in 1930; 61.0 percent in 1935; and 68.4 percent in 1940. Indications in 1950 are that the mills will operate at about the 1949 rate.

R. R. Winters, vice-president, Commander-Larabee Milling Co., Minneapolis, emphasized the problem of inadequate depreciation and obsolescence rates. He stated that during the past 25 years milling technology has advanced faster than rates of depreciation, with the result that cost of replacement has been greater than the reserves set aside for obsolescence. He anticipates that during the next 25 years technological progress will be increased and that replacement costs will be higher than even the present high rate.

He recommended that the Federation attempt an upward revision of depreciation rates to more than 2½ percent on buildings and 4 percent on equipment. He also suggested that the millers themselves set up tax-paid reserves, which will help offset the inadequacies of the present low rates allowed for depreciation and obsolescence.

Elmer W. Reed, chairman, grain standards committee, reported progress by the milling industry and the U. S. Department of Agriculture toward establishing yardsticks to determine degree of insect infestation. Research studies are being carried on in mills (selected by F&DA on how to reduce infestation, on how to measure degree of contamination, on how to determine a "normal" contamination, on how to educate grain growers and handlers to avoid or reduce contamination, and on how to protect the millers from contaminated incoming grain.

Federation's 1950–1951 Officers

President and Chairman of Board: Howard W. Files, Vice-President, Pillsbury Mills, Inc., Minneapolis.

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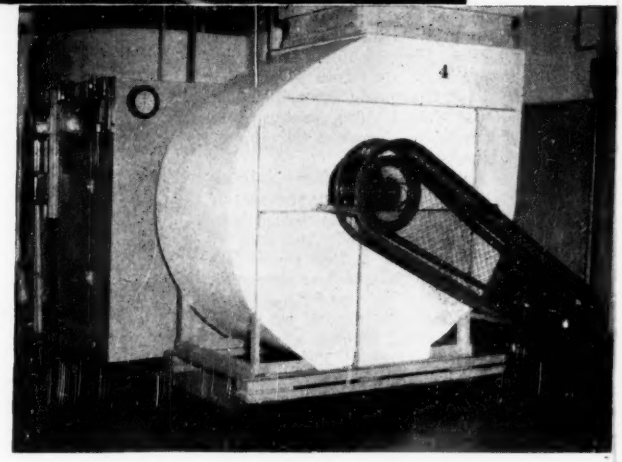

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Food Industry News

Further Research on Cereal Grains Cited at Chicago AACC Meeting

Studies on starch quality, sorghum grains and fatty acids were included in the formal reports at the 35th annual meeting of the American Association of Cereal Chemists, held in Chicago, in mid-May. Symposia on enzyme technology, laboratory baking test, starch technology and bleaching technology also held featured places on the program.

Stanley A. Watson, Corn Products Refining Co., reported that although starch quality is generally related to grain condition, its final quality may be affected by steeping time, temperature, sulphurous acidity, flora and rate of draw of steep water. Properties of grain sorghum starch were found, he said, to be similar to those of corn starch.

Workers at Northern Regional Research Laboratory, Peoria, Ill., stated that grain sorghum can be processed satisfactorily by methods used industrially for recovery of starch, gluten, and oil by wet-milling of corn. Optimum separation of starch and gluten was obtained when grain sorghum was steeped at 110-120 deg. F. for 24 hr. or longer in a 0.2-0.25 percent SO_2 solution in water. Low protein content of 0.35-0.7 percent was obtainable when the pitch of the starch table was increased beyond that used in milling corn. Drying of grain sorghums harvested at three moisture contents and dried at 125, 150, 175, and 200 deg. F. showed no detrimental effect upon wet-milling operations if the sorghum is not dried to less than 12-13 percent moisture content.

Sorghum Starches

Studies by Research Division, Anheuser-Busch, Inc., St. Louis, Mo., on starches from more than 15 varieties of sorghum grains indicate a wide difference in viscosity values and cold gel characteristics. Non-waxy (nonglutinous) starches have characteristics similar to corn starch. Waxy (glutinous) types are similar to the root starches. Both types perform satisfactorily in custards, puddings, fruit pie fillings, and cold-mixed desserts; in some cases are superior in performance to other cereal starches and some root starches.

Data from the Central Laboratories, Research & Development Department, General Foods Corp., Hoboken, N. J., indicate that fatty acids form a "complex" with the amylose content of flour and wheat starch with definite hydration and gelling properties. The physical properties of the complex are dependent upon the amount of fatty material in the complex and on the length of the fatty acid chain. All acids studied raised the viscosity of flour and wheat starch as measured by the amylograph. The study was made to determine the effect of fatty acids on the cooking viscosity of bleached cake flour and various common starches.

Voluntary Inspection Is Tabled by BAI

Voluntary continuous inspection and certification of meats, meat byproducts, and meat food products will probably not be offered by Bureau of Animal Industry to those plants which are not operated under the Federal Meat Inspection Act.

The proposed regulations under the "so-called" Farm Products Inspection Act appeared on p. 2757 of the May 9 *Federal Register*. Written comments were invited by June 2 and were received in large numbers. It developed that this was a very controversial proposal, so no further action is contemplated at the present time.

Purpose of the proposed new regulations was to give inspection at those plants where the service is desired, "to assure that product certified by the inspectors at such plants and so marked as provided in the regulations is sound, healthful, wholesome, and fit for human food."

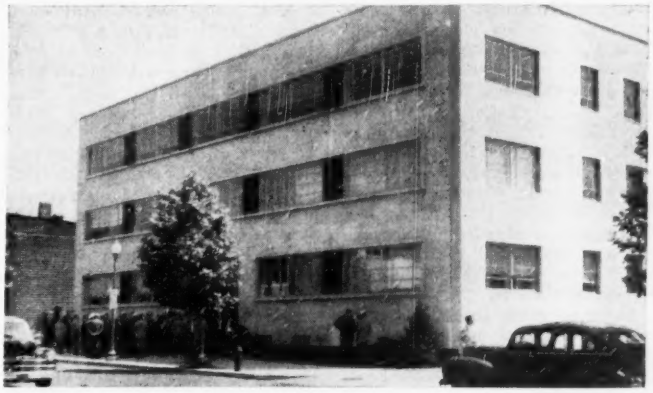
Coffee Crop and Exports Decline in Brazil

Brazil's 1950-51 coffee crop will fall well below that for the past season, according to Ministry of Agriculture estimates. The forecast is for a total of 14,215,000 60-kilo bags. Current carryover has not yet been announced, but it is not expected to come near making up the margin to 1949-50's 19,368,468-bag export total.

Shipments in April 1950 bear out the low-crop forecast, having run less than 800,000 bags for the lowest figure since the postwar period.

Coffee exports were off 25 percent in the first quarter, compared with the same period in 1949, according to Sao Paulo trade reports. Shipments to the United States slipped 25.6 percent while those to other areas were down 23.4 percent.

In the case of the U.S., the drop is blamed largely on the Gillette enquiry. But the fall in other shipments, mainly to Europe, is blamed on official insistence on payment in dollars from countries with convertible currencies.



Canners' New Center

National Canners Assn. dedicated its new $1,000,000 research center on June 8. Designed to aid food technologists in maintaining and improving the purity and wholesomeness of canned foods. Building will house the association's laboratories and administrative offices as well as serve as the association's national headquarters.

1951 Award Competition Announced by FI

Entries in the competition for the 1951 Food Industries Award — for achievement in food technology — may be submitted any time in the next few months, FI has announced. The deadline is January 1, 1951, but most entries are expected well ahead of that date. Nominations for the Award may be made by anyone.

Those entering the competition will submit evidence of a character that will enable the Award Jury to evaluate the merits of the process. This evidence will be passed along to the Award Jury by the Editor of FI, who acts as secretary of the Jury. The Jury will be appointed by the Institute of Food Technologists, and its members will be technologists connected with colleges and universities.

The best evidence that can be submitted is a technical description of the process, accompanied by a flow diagram and photographs, and including an explanation of the following:

1. **How the process came to be developed.**
2. **The steps by which it was developed.**
3. **The success, technological and economic, which it has achieved.**

The Award is for an improved or novel process, not for a food product itself. It will go to a company, not to an individual, its purpose being to encourage food processors to develop or adopt improved processes.

The process must be in commercial use prior to January 1, 1951, and shall have been put to such use subsequent to January 1, 1946.

The Award will be presented at the 1951 annual conference of the IFT.

Clinton Buys Idaho Plant, But Drops Pasco Deal

Acquisition of the Northern Idaho Frozen Foods plant at Lewiston, Idaho, by Clinton Foods, Inc. was announced recently by N. B. Barclay, Vice President in charge of production, Snow Crop Marketers Division. He pointed out that this is the first plant for processing Snow Crop quick frozen foods and vegetables to be purchased by Clinton, although the company owns large juice packing facilities in Florida.

The Northern Idaho plant, was built a little over three years ago. Approximately 4200 acres of peas, mostly of the Thomas Laxton's and the new Dark Skin Freezer variety, are now under contract to the new plant. This will mean a production running close to 6,000,000 lb. in 1950 and it is expected this production will be doubled in 1951.

In addition to peas, long range plans are now being laid to process lima beans, asparagus, mixed vegetables, peas and carrots, succotash, and raspberries in SNOW CROP'S Lewiston facilities. It is expected this diversification of activity will contribute materially to sustained employment throughout the area.

In the meantime, possibilities of the biggest citrus deal in the history of Florida apparently fell through when the reported purchase by Clinton Foods of the Pasco Packing Co. collapsed. The deal would have involved a reported purchase price of from $18 to 20,000,000.

President J. E. Evans, of Pasco Packing Co., announced that discussions between the two companies had been terminated and that no agreement had been reached.

The Florida investments of Clinton Foods include groves and citrus processing facilities. It packs under the trade name of Snow Crop. Merger of Clinton and Pasco would have given Clinton approximately 11,600 acres and a production of from 2- to 3,000,000 boxes of fruit a year.

Residue Tolerances Heard By F&DA

The residue tolerances hearing was recessed from May 22 to July 10. Part A of the hearing was completed in the morning of May 22, after a little over four months of testimony on "the necessity for using various added substances for controlling enemies that interfere with the production of fresh fruits and vegetables."

Part B of the residue hearing was over in a little less than an hour, with a single witness, Dr. A. J. Lehman, head of pharmacology division, F&DA. This part of the hearing "dealt with the particular substances used and whether they are poisonous or deleterious so as to require tolerances." (See page 134.)

Part C of the hearing required about two hours, and only two witnesses were heard. It "dealt with the sources from which consumers may receive" the poisonous or deleterious substances identified previously. First E. P. Laug testified as to the normal quantities of arsenic, mercury, cadmium, lead, and selenium that might be ingested from natural food sources. He is in charge of the physiochemistry branch of F&DA's division of pharmacology. Next, data on quantities of food purchased by typical consumers were presented by Dr. Faith Clark of the Bureau of Human Nutrition and Home Economics in the U. S. Department of Agriculture.

Part D of the hearing was set up to take evidence "as to the quanity of each added poisonous or deleterious substance or combination of such substances that can be tolerated on each fruit and vegetable without danger to the public health." The presiding officer has issued a list of chemicals on which evidence will be taken and requested that interested persons indicate any other substance on which toxicity data will be offered. It is expected that this part of the hearing will be completed this fall.

USDA Subtilin Studies Show Wide Promise

Don't expect to use subtilin or other antibiotic in canning for a year or two at least. USDA scientists report that use of these germ-destroying additives is still in the early stages of development. But they regard their use a sure thing in the future. A number of food processors are interested in the new method.

That subtilin can kill the microscopic plant called botulinous, potentially the most lethal of food poisoning organisms, was given wide publicity recently. The USDA has done considerable work on subtilin at its Western Regional Research Laboratory in Albany, Calif. since 1944.

Using the method, canners will be able to cook food products in one quarter the usual time, and at below-boiling temperatures. Dr. A. A. Andersen and Dr. H. D. Michener of the USDA laboratory found that when tiny amounts of subtilin are added to canned foods they can be sterilized effectively at 212 deg. F or lower in 5 to 10 minutes without pressure-cooking equipment.

This method, of course, would be merely an added precaution. In recent years there have been no food poisoning cases reported to the Public Health Service resulting from canned products. However, the improper use of home-canning equipment has increased deaths from botulism. From 10 to 20 people die every year as a result of eating home-canned asparagus, turnips, etc.

Government researchers claim that the new canning method, besides helping canners cut their processing costs, will improve the flavor and texture of many canned foods. This is possible because the usual long periods of cook-

ing at high temperature can be avoided.

Peas, asparagus, corn, green beans, peeled potatoes, precooked rice, fish, chicken, and mushrooms are some of the products that have been preserved satisfactorily with subtilin and mild heat treatment in preliminary studies at the California laboratory. In recent taste tests, laboratory food experts found little or no difference in flavor between servings of cut corn preserved in this way and fresh corn.

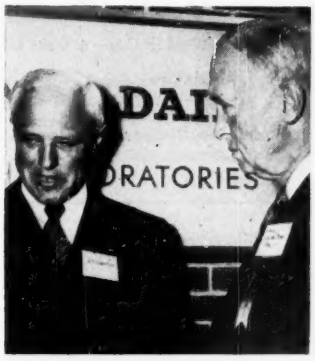
The process also offers a means of preserving foods that are not usually canned by ordinary methods, the USDA says. Examples are broccoli, cauliflower, and brussels sprouts. Subtilin and mild heat can be used to preserve them to retain their quality.

About one ounce of subtilin will produce enough mild saline solution to preserve a ton of canned food, making the process reasonably cheap despite the high cost of subtilin. Subtilin is produced somewhat like penicillin—in submerged fermentation. It is expected that its cost will go down as soon as use is expanded, following the pattern of penicillin, streptomycin and similar antibiotics.

Higher Sugar Recovery

Dr. John H. Payne, sugar scientist with the experiment station of Hawaiian Sugar Planters Assn., Honolulu, has been issued a patent on a process by which one-half the sugar remaining in molasses can be recovered.

Described as a "selective solvent process for treating final molasses in the sugar factory," the process has not yet been subjected to pilot plant operation.



Attend Dairy Opening

A scientific conference marked the dedication of the new National Dairy Laboratories, at Oakdale, L. I., last month. Here Dr. Karl T. Compton, chairman, MIT, discusses the project with President L. A. Van Bomel, of National Dairy.

for seasoning Food Products

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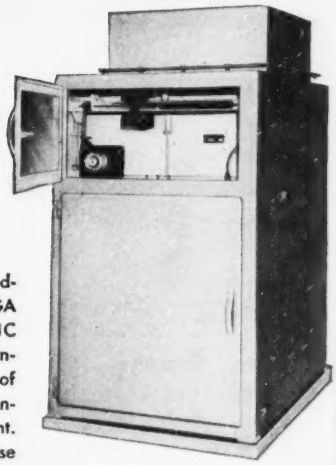

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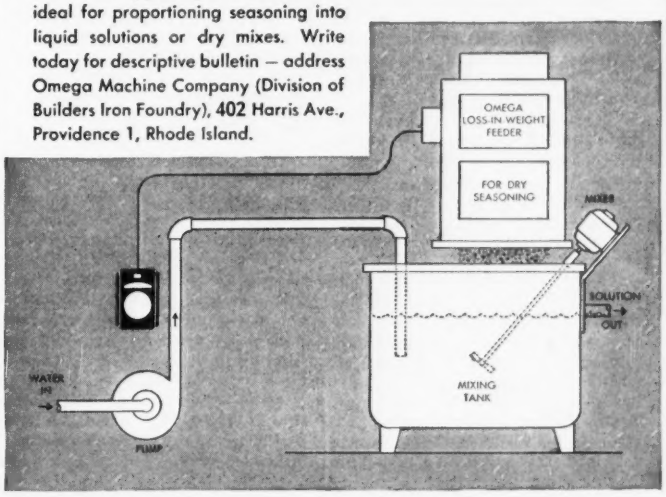

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Rotolock Feeders
Dust Collectors
Bucket Elevators

THE LAST WORD IN FEEDERS
OMEGA

Big Cheese Building

Kraft Foods claims that this is the largest cheese processing plant in the world. It has just been completed in Chicago for the manufacture of products distributed in the company's central division as well as the entire volume of certain products for national distribution. The building also houses division offices.

Dairies "Overcharged" On Pollution Load

Spokesmen for the dairy industry charged, at the May meeting of the National Technical Task Committee on Industrial Wastes in Washington, that "arm-chair" engineering by state and municipal health departments results in dairy firms being charged with a larger pollutional load than they actually generate.

These load figures are used in charging industry for the use of municipal sewage treatment facilities, for example.

Sanitary engineers use obsolete information in obtaining pollution load and seldom take into consideration new waste water treatment equipment that may be installed in a particular plant. The "average" figures for the industry should not be applied to any particular plant, one spokesman said. The inference is that if the state or municipal engineers do not know what the wastes of a certain plant are, they should go out and measure the effluent, and not look up an obsolete data book with figures on consumption of processing water used in the industry.

Because of reuse of water, and other "good housekeeping" practices, many plants do not turn into the stream any constant proportion of waste water that could be arrived at by a perusal of water consumption figures.

The reasoning holds good for canning and other food processing plants, of course.

The task Committee meeting was called by the Surgeon General of the U.S. Public Health Service and included representatives of 19 industries. The committee will draw up a program to solve water pollution problems caused by industrial wastes for which no methods of treatment have been developed and to improve existing waste treatment methods where needed.

The canning industry was represented by N. H. Sanborn, Chief Chemist, Research Laboratory, National Canners Association, Washington, D. C.; Frank J. McKee, engineer with the Kraft Foods Co. of Chicago, represented the milk industry.

Prepackaging Thumpers Get Tubs Muffled

There are many problems to be solved before prepackaging of fruits and vegetables at the farm shipping point can be widely recommended, the Department of Agriculture reports.

A two-year study by USDA plant scientists at a Florida farm reveals that there must be adequate refrigeration at every step along the way from the time the produce is harvested until it is sold to the consumer. At present, the majority of wholesalers and retail stores do not have refrigeration facilities to adequately handle the most perishable lines of prepackaged produce.

The federal agency reports that although proper packaging and refrigeration often help maintain quality of fruits and vegetables the package itself offers no means of improving the quality of its contents. "In vegetables and most fruits, quality declines continuously after harvest. The best handling methods only slow down the rate of decline," USDA states.

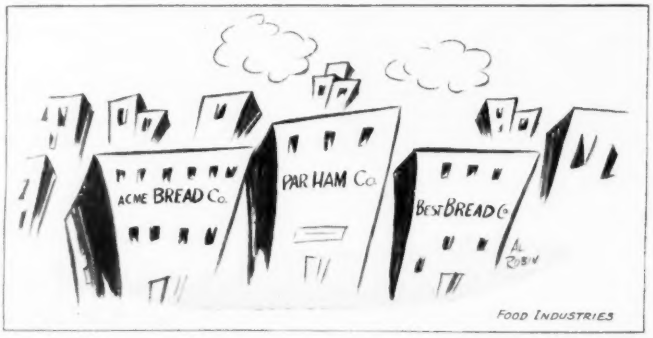
USDA tests also revealed that chemical treatments—such as dipping in ascobic, citric, or hydrochloric acid—did not prevent discoloration. In fact, these solutions accumulated great numbers of microorganisms which increased loss from rot and decay.

Neither did chlorine, used in the hydrocooler water where the vegetables were precooled immediately after harvest, completely sterilize the surfaces of the vegetables.

Lists Substances Bearing Hazardous Residues

Arnold J. Lehman, head of the pharmacology division, Food and Drug Administration, in testifying recently at the residues hearing listed the residues of 55 substances, which in his opinion constituted public health hazards. These substances, he said, are poisonous or deleterious or both. Individually and collectively these substances are:

Heptachlor—Cadmium copper lime chromate
Aldrin—Selenium derivatives
Benzene hexachloride—Copper arsenate
Dieldrin—Copper acetoarsenate
Lindane—Lead arsenate
Chlordane—Magnesium arsenate
Toxaphene—Zinc arsenite
TDE—Calcium arsenate
DDT—Basic lead arsenate
Nitro-chlorophenyl-propane — Manganese arsenate
Nitro-chlorophenyl butane—Arsenic trioxide
Sodium arsenite—Paraoxone
Tartar emetic—Tetraethyl-dithionon-pyrophosphate
Bismuth subsalicylate — Ethyl-p-nitrophenyl-thionobenzene phosphate



Barium fluosilicate — Octamethyl pyrophosphoramide
Barium carbonate—Glyoxalidine
Cryolite—Lethane-60
Sodium fluosilicate—Lethane-384
Sodium fluoride—Lethane A-70
Mercurous chloride—Thanite
Mercuric chloride—Phenothiazine
Phenylmercuric triethanol ammonium lactate—Dinitro-o-cresol
Ethyl mercuric phosphate — Dinitro-o-cyclohexyl-phenol
Phenylmercuric acetate—Dinitro-o-cyclohexylamine salt of phenol
Phenylmercuric formamide—Dinitro-secondary butyl-phenol
Phenylmercuric monoethyl ammonium acetate—Triethanolamine salt of dinitro-secondary butyl-phenol
Parathion—Dinitro capryl phenyl cretonate
Methyl parathion

"These substances," Dr. Lehman added "are likely to leave residues as a result of their commercial use as insecticides or fungicides. Naturally, the significance of the public health problem is dependent upon the amount of residue likely to remain when they are used in the production of fruits and vegetables." He thought that a quantative tolerance for each of these substances is necessary for protection of the public health.

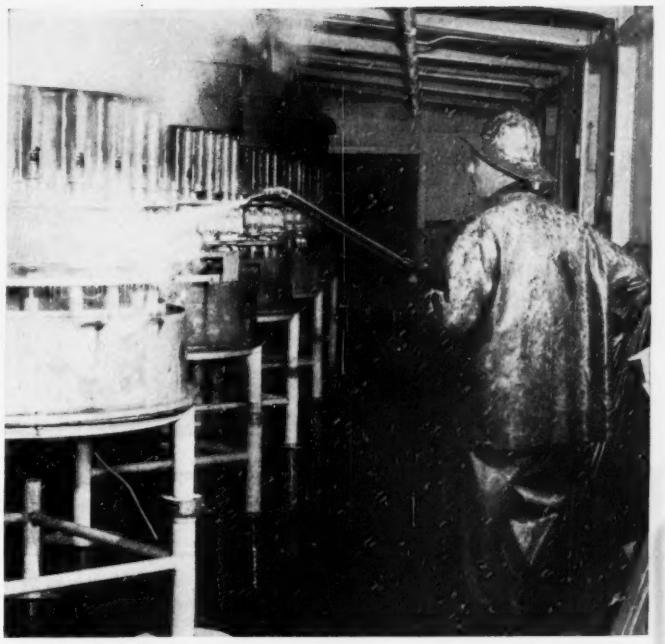
Big Cost, Small Help In Fisheries Bill

A "fisheries stabilization" bill calling for a price-support program for U. S. fishermen was introduced in Congress late in May by Senator Magnuson and Representative Jackson, both Democrats of Washington. An identical bill was also introduced by Rep. Hugh B. Mitchell, D. of Washington. The new bills are patterned after Senate Bill 856, introduced by Magnuson last year.

The bill sets up a Fisheries Stabilization Corp. with power to support fish prices to the fishermen at 90 percent of parity. It would be operated in the manner of the present farm support program—by means of loans, purchases, and other operations.

The National Fisheries Institute thinks that if adopted, the bill would put the government into the fish business and put the fish business out of business. Contrary to its sponsors' beliefs, it would not result in cheaper prices of fish products to housewives, or lowered production costs. Lowered production costs are the only way the "too big a spread" between what the fisherman receives and the housewife pays could be cut down.

The bill proposed to set up a 22-man board of advisers. Fish packing industry would not be represented on this board. It would include, however, such diverse interests as labor retailers,



NO TWO DAYS ABOUT IT!

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It does such a good job in so little time that you're probably thinking of it as a way of simplifying other work. Cleaning conveyor chains, for example, tables, peelers, sorters, tubs, sealers. It's a natural for all those ... and paint stripping, too!

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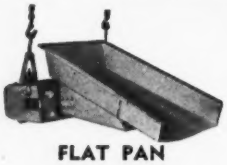

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Coffee Tree Yields

Variations in the yields of individual coffee trees is illustrated in these baskets. Measured harvests of 60 blocks of 100 trees proved that the yield varies from one-tenth of a pound (left) to 15 lb. of dry coffee per tree per year. (USDA)

wholesalers, fishing boat owners and representatives of the U. S. Fish and Wildlife service.

Congressman Jackson says the primary function of the bill is to close the gap between the price the fisherman receives and the price the consumer pays. No mention is made of the millions this would cost the taxpayers. Only 150,000 fishermen would benefit.

The bill also includes a provision for limitation of imports through import fees or quotas "whenever fish imports threaten to impair the price-support program or reduce the total amount of fish processed in the U. S." This action would be "recommended" to the President by the 22-man board. The President, however, would not have to take any action.

Under the bill, fishermen could (and probably would) be paid for not fishing on certain days (in the manner that a farmer is paid for not tilling a certain number of acres of land).

It does not require much imagination, say the bill's opponents, to see the hordes of n'er-do-wells and shiftless, who, classified as "commercial" fishermen would be paid for sitting on piers and wharfs enjoying life at the taxpayers' expense.

More Dried Eggs

Despite the excessive inventory of dried eggs in government storage and the expectation that they will be sold at a loss of 90 cents on the dollar, 55 egg drying plants are continuing to operate under contracts with the Commodity Credit Corporation, according to the National Egg Products Assn., Chicago.

These plants are located in 11 states as follows: Iowa, 11; Minnesota, 10; Kansas, 8; Missouri, 8; Nebraska, 5; Texas, 4; Oklahoma, 3; Indiana, 3; Illinois, 1; South Dakota, 1; and Wisconsin, 1.

Cornell Will Continue 1-Year Dairy Course

The one-year curriculum in dairy industry, which has been offered at the New York State College of Agriculture at Cornell University, for the past two years, will be repeated during the coming year.

The program consists of courses organized exclusively for those enrolled in the curriculum, with the exception of a year course in Oral and Written Expression and a one-term course in Agricultural Bacteriology.

Applicants for the one-year course must have graduated from high school and must present the 15 units of entrance credit required by the University. Previous experience in the dairy industry is necessary.

The courses included in the curriculum are definitely of college grade. They are designed to help those who already know some of the "how" of the dairy industry to learn also some of the "why." One who completes the program with a superior record and who so desires may transfer to the regular degree course and receive credit for all the courses he has passed in the one-year curriculum.

The complete schedule includes: Oral and Written Expression, Agricultural Bacteriology, Processing of

Milk and Milk Products, Elementary Dairy Industry, Milk Marketing, Dairy Plant Equipment, Dairy Mathematics, Milk Production, and Physical Training.

Course begins the third week in September. Requests for further information should be addressed to Professor Leigh Harden, Roberts Hall, Ithaca, New York, who is in charge of admissions to the College of Agriculture.

SEC Lists 8 Food Heads As Topping $100,000

According to figures just released by the Securities and Exchange Commission on 1949 salaries paid to the managers of the nation's top food processing industries, Harry Bullis, chairman of the Board of General Mills, Inc. ranked highest with earnings of $165,420. Seven others were reported above 100,000.

Top salaries reported to the Commission by firms in the food processing and related fields were:

L. A. Van Bomel, president, National Dairy Products Corp., $150,500; Clarence Francis, chairman of the board, General Foods Corp., 137,835; Thomas E. Wilson, chairman of the board, Wilson & Co. Inc., 138,537; Theodore Montague, president, The Borden Co., 133,000; Austin Igleheart, president, General Foods Corp., 122,-468; John H. Kraft, vice-president, National Dairy Products Corp., 111,-690; Leslie Perrin, president, General Mills, Inc., 101,822; George Coppers, president, National Biscuit Co., 101,-800; Roy Tomlinson, chairman of the board, National Biscuit Co., 91,100; Joel Mitchel, president, Standard Brands, Inc., 87,500; Harold Comfort, executive vice president, The Borden Co., 79,750; Warren Oaks, president, Fleishmann Distilling Corp., 75,414; Edward Foss Wilson, president, Wilson & Co. Inc., 64,792; F. W. Hoffman, president, Cudahy Packing Co., 60,210, E. A. Cudahy, chairman of the board, Cudahy Packing Co. 60,150.

Combined Canner Groups Plan Chicago Meeting

The 1951 canners convention in Chicago will bring together at one time all of the participating groups, rather than on a departmentalized schedule as was the pattern in Atlantic City at the last convention.

Scheduling a simultaneous period of meetings and contacts is in response to the wishes of a majority of the memberships of the three sponsoring associations—National Canners Association, National Food Brokers Association, and Canning Machinery & Sup-

HAYSSEN—WRAPPED

Better wrapping at lower cost by using a Hayssen. Fully automatic—it replaces costly hand wrapping. Provides exact registration of printed overwraps. Operates quietly at a high production rate. Backed by 40 years' wrapping machine experience.

WRITE TODAY for full information and the name of your Hayssen representative.

HAYSSEN MFG. COMPANY • SHEBOYGAN, WIS.

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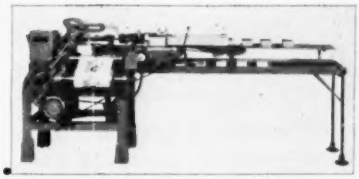
ELECTRIC EYE WRAPPING MACHINES

IT PAYS TO WRAP
THE HAYSSEN WAY



ATTRACTIVE PACKAGES! It's easy to produce neat, eye-appealing packages — so important in product merchandising today — when you use Union Special's *Style 60000 D* machine to close small paper bags with the exclusive *"Dubl-Tape"* sewed closure.

CAPITALIZE ON THESE FEATURES! Machines are especially designed to help you solve your packaging problems:

- **FAST**—keyed to output of standard filling and weighing equipment.
- **VERSATILE**—conveyor adjustable for various bag sizes. Efficient on short or long runs.
- **ECONOMICAL**—requires only a modest investment. Uses inexpensive cotton thread and paper tape.
- **EASY TO OPERATE**—anyone can quickly learn to run machine without previous experience.
- **SEMI-AUTOMATIC OR AUTOMATIC**—for use with one operator or part of a completely automatic installation.

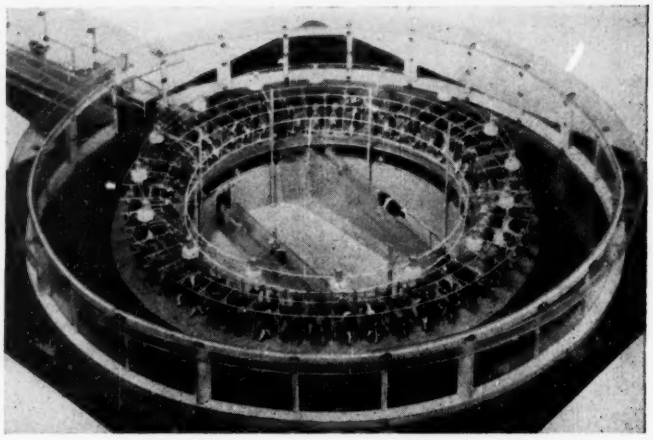
Send for your COPY!

• **BULLETIN ON REQUEST.** Bulletin No. 100 shows how food packers are making profitable use of this machine and how you, too, can use it for closing small paper bags.

Union Special

MACHINE COMPANY

450 N. Franklin St., Chicago 10, Ill.



Australian Rotolactor

This is a plastic model of the world's third milking plant of its kind and the first in Australia. Its builders claim that this one differs from the Walker-Gordon plant in New Jersey, "in that it was planned from an architectural as well as a mechanical standpoint. Camden Park Estate Pty., Ltd., New South Wales, are having the plant installed. It will milk 50 cows at one time, automatically weighing and piping the milk to the dairy for final processing and distribution. (Eastern Pub.)

plies Association. It was realized that the hotel problem will be intensified by bringing all groups into Chicago at the same time. This has been thoroughly canvassed with the Chicago Convention Bureau and hotels, and it is believed that plans now developed will make it satisfactory to concentrate convention activities into the week of February 18, 1951. The annual C.M.&S.A. Exhibit will open on Saturday, February 17.

Michigan State Plans New Food Course

Michigan State College, Lansing, Michigan, will conduct a new course to train young men and women for executive and managerial positions in the field of food distribution. Announcement of the course was made today by Lansing P. Shield, chairman of the college training course committee of the National Association of Food Chains, and president, Grand Union Co., New York City.

Dr. Kenneth Wilson, Professor of Business Administration at the college, will serve as director of the Curriculum of Food Distribution. He will devote full time to the planning and development of the program of study. The course has been made possible under a grant of $87,500 by a number of interested companies through the National Association of Food Chains.

Special courses in Food Store Management, Food Merchandising and Food Store Administration are to be introduced by Dr. Wilson. The graduate research work under his direction will include specific management problems of Food Distribution.

USDA Grade Standards

Recent actions by Production and Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Dressed poultry and dressed domestic rabbits, form of application and contract for inspection service, new, proposed, p. 2465, May 2 *Federal Register.* No written comments were received by the June 1 deadline, so promulgation as proposed was expected some time in June.

Ready-to-cook poultry and ready-to-cook domestic rabbits, prerequisites to grading service, new, p. 2838, May 12 *Federal Register,* effective June 11.

Carcass beef, revised, proposed, p. 2845, May 12 *Federal Register,* written comments received until July 11. A hearing on this subject was also announced on May 31, with official publication on p. 3487 of the June 3 *Federal Register.* The hearing was to open June 28 in Chicago. Principal changes proposed, and to be discussed at the hearing, relate to steer, heifer, and cow beef only. "It is proposed (1) to combine existing U. S. Prime and U. S. Choice grades into one grade to be designated U. S. Prime; (2) to redesignate U. S. Good grade as U. S. Choice; and (3) to divide the present Commercial grade into two grades with

beef from high quality cattle that have not reached full maturity being graded as U. S. Good and all other beef currently graded as U. S. Commercial retaining such grade designation." Various other minor changes in carcass beef standards were also proposed in the notice. Equal weight will be given to oral presentation in Chicago and to written comments received in Washington.

Frozen corn-on-the-cob, new proposed, p. 3034, May 18 *Federal Register*, written comments received until June 17.

Extracted honey, third revision, proposed, p. 3036, May 18 *Federal Register*, written comments received until August 16.

Frozen okra, new, proposed, p. 3157, May 24 *Federal Register*, written comments received until June 23.

Blueberries for processing, new, proposed, p. 3190, May 25 *Federal Register*, written comments received until June 24.

Canned apple juice, revised, p. 3209, May 26 *Federal Register*, effective June 25.

Canned apple sauce, second revision, proposed, p. 3284 May 27 *Federal Register*, written comments received until June 26.

Cantaloupes, revised, p. 2703, May 9 *Federal Register*, effective June 8.

Green corn, revised, proposed, p. 3157, May 24 *Federal Register*, written comments received until June 23.

Anyway, It's An Apple

We can't quite figure out from the photographer's caption what this lady has to do with apples, except the eating of one, but rather than risk not bringing all aspects of food production to your attention we present Helene Carlton, who was said to be visiting Apple Valley. As though you cared. (Wide World)

POWERS No. 11 Self-Acting REGULATORS

now give you MORE for your money

OVER-HEAT PROTECTION

No Extra Charge
Sizes: ¾ to 2" inclusive

VALVE STEM LUBRICATOR

UNSURPASSED FOR DEPENDABILITY and LONG LIFE

Lower Maintenance Cost and— BETTER

CONTROLS HEATING OR COOLING MEDIUMS LIQUIDS OR AIR

TEMPERATURE CONTROL

SIMPLIFY your temperature control problems by standardizing on POWERS No. 11 Self-acting Regulators. Use them when you want a simple rugged control to maintain a constant temperature. They prevent OVER-heating, save fuel and labor, pay back their cost several times a year and give years of dependable control.

Backed by over 55 years of experience in self-acting regulators. Engineering service available in over 50 cities.

No. 11 INDICATING REGULATOR has 4" dial mounted on top of regulator. Both thermometer and regulator operate from same thermal system. Visual check on performance of regulator is provided making it easy to adjust for different temperatures. (1185)

TYPES AVAILABLE—Direct and reverse acting regulators with Double Seat balanced valve, double unions ½ to 2" incl., flanged 2½ to 6" incl.; Single Seat valve double unions ¼ to 1¼" incl. 3-Way valve ½ to 4" incl. —shown in Bulletin 329. **Use coupon below**

THE POWERS REGULATOR CO., 2793 Greenview Ave., Chicago 14, Ill.

Gentlemen: Please send me Bulletin 329. Am interested in control for

Name _____ Title _____

Firm Name _____

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Blueberry packers use conveyor belts to reduce costs

● By washing and automatically sorting blueberries on Cyclone Stainless Steel Conveyor Belt, Eastern growers and processors have eliminated hand sorting, thereby effecting extensive savings in production line labor costs.

Blueberries are only one of hundreds of food products that can be processed at lower cost on Cyclone Metal Conveyor Belts. There's a style, type and size to fit most processing requirements.

Get in touch with the nearest Cyclone sales office for the complete story on Cyclone Metal Conveyor Belts for your plant. And, meanwhile, write for Catalog No. 4.

CYCLONE FENCE DIVISION
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DEPT. H-70, WAUKEGAN, ILLINOIS
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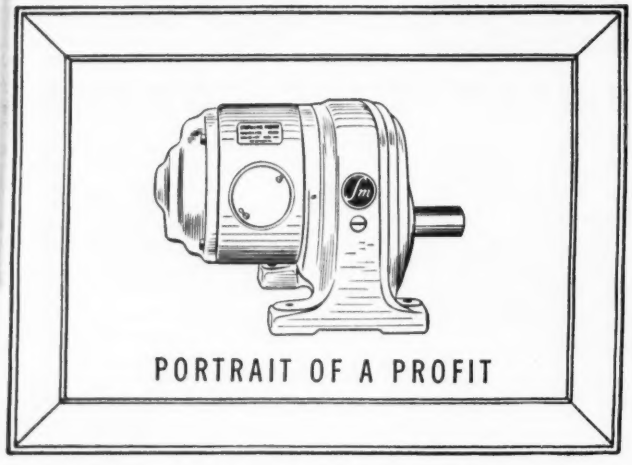
UNITED STATES STEEL



PORTRAIT OF A PROFIT

For greater profits, use Sterling Slo-Speed Electric Power Drives

STERLING
ELECTRIC MOTORS

PLANTS: NEW YORK 51, LOS ANGELES 22, HAMILTON, CANADA—OFFICES IN PRINCIPAL CITIES
Write for Bulletin
SLO-SPEED (Geared) • SPEED-TROL (Variable Speed) • KLOSD (Normal Speed)

Antibiotic Feeding

Greater quantities of meat are promised by the discovery that aureomycin increases rate of growth when added to regular animal diet. Here, Drs. James McGinnis, Washington State College, and E. L. R. Stokstad, Pearl River, N. Y., examine seven-day-old turkeys. (Wide World)

Starter Solutions Boost Yield of Tomatoes

Increases in yields of cannery tomatoes of one and half tons to the acre are not at all uncommon following the use of "starter" solutions at transplanting time, according to Prof. C. B. Sayre, head of the Vegetable Crops Division at the New York State Experiment Station at Geneva.

The starter solution is applied by means of the transplanting machine at the rate of one fourth pint to the plant. At present sufficient materials for making up enough starter solution to treat an acre will cost about a dollar and a half, says Professor Sayre.

There are several brands of completely soluble materials now on the market for this purpose, he explains. These are more convenient to use than regular commercial fertilizers, which contain considerable insoluble residue that must be strained out before use otherwise it will clog the tubes of the transplanter.

F&DA Food Standards

Status of food standards actions by Food & Drug Administration at the beginning of June is reviewed below. Hearings in progress:

1. *Canned mushrooms.* Recess extended from May 15 to June 15, to accomodate interested parties.

2. *Residue tolerances.* In recess from May 22 to July 10. (See separate stories in this section.)

Tentative orders awaited follow:

1. *Frozen fruits.* Long awaited; hearing adjourned in July 1948, briefs filed by October 1948.

2. *Bread.* Expected soon; hearing adjourned in September 1949, briefs filed by February 1950.

Final Orders Awaited

1. *Salad dressings.* Long awaited; tentative order published in November 1949.

2. *Cheeses.* Long awaited; tentative order published in April 1949.

3. *Canned corn.* Expected during fall; a few exceptions to tentative order received in early June.

4. *Coal-tar color:* FD&C Violet No. 1. Expected soon; no exceptions filed on tentative order published on p. 2814 of May 11 *Federal Register.*

Standards Completed

(None since last reported, in June 1949.)

Hearings Expected

1. *Preserves.* Amendment, requested by industry, announcement expected soon.

2. *Ice cream.* New, resumption of prewar hearing, may follow residue tolerances hearing in late fall or winter.

Oleo Labeling

To clarify the recently added Section 407 of the Federal Food, Drug & Cosmetic Act, which covers colored oleomargarine, the Food & Drug Administration recently issued a statement covering the general policy and interpretation.

It spells out labeling of the package as to size of the word "oleomargarine" or "margarine" and statement of ingredients. Either of the two words must be as large as any other wording on the package and must be at least 20 points—5/18 of 1 in. high.

German Fisheries Gadget

This electronic implement removes fish scales, operating like a big razor. It was exhibited at the first postwar exhibition of the German fishing industry, held recently at Bremen. (Wide World)

Once they said "It's the berries!"
When slang was in favor—
Meaning "Great!"—which has always meant
NORDA RASPBERRY FLAVOR!

Go beating around many a raspberry bush, if you want to, out in the hot, hot sun. Pick your own fine, fat berries.

Or do the smart thing—come to Norda!

Norda Raspberry Flavor—red and black—has real raspberry, true-fruit taste. Both genuine and imitation Norda Raspberry are expertly made to help *you* make more popular syrups, mixes, candies, and gelatins. Use Norda for all your products.

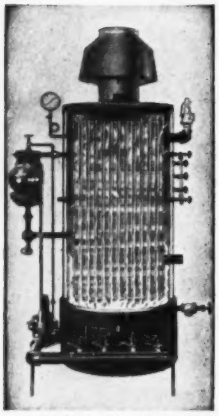
Test Norda Raspberry Flavor yourself. Send for free samples—and get your catalogue of all the superior Norda Flavors. Start improving—and saving. Send to Norda today.

Norda Raspberry . . . Another "Favorite to Flavor It"

Norda ESSENTIAL OIL AND CHEMICAL COMPANY, INC.
601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO
HAVANA • MEXICO CITY • LONDON • PARIS

WILL YOU HAVE **Steam** FOR PROCESSING THIS SUMMER?



The KANE Boiler is built to A.S.M.E. specifications, in sizes to 30 H.P.

Would you like to shut down your central steam system this summer? . . . there is still time to make some saving by doing so. Act now to insure an independent, *dependable* source of Summer Steam for your processes—we would suggest . . .

the Kane Boiler Package

Each KANE BOILER PACKAGE is carefully considered by us as an "individual" job,—from the customer's requirements to the finished unit. And each BOILER PACKAGE is a compact, self-contained steam source that includes: the correctly sized KANE Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

ENGINEERED STEAM AT ITS BEST

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

● LA PORTE

FLEXIBLE STEEL CONVEYOR BELTING

Whether your process is Freezing, Canning, Pickling, or Dehydrating, a La Porte Belt will carry your product through every operation, plus packaging and crating safely, quickly and economically. Its strong steel mesh construction resists loading impacts, prevents creeping, weaving, and jumping, and permits the circulation of air, and liquids around products in process . . . also facilitates cleaning and sterilizing.

Ask your Supplier TODAY for La Porte Conveyor Belting. It is available in any length—almost any width.

LA PORTE MAT & MFG. CO.

BOX 124 LA PORTE, INDIANA

Electronic Fishing

Depth recorders, developed during the war, are now being used on about one-third of a flotilla of 300 to 400 shrimping boats, off Florida. With coral reefs playing havoc with expensive nets, the wavy line feeding through the viewing screen warns the captain. (Wide World)

Nutrition Foundation Renews 16 Grants

Renewal of 16 research grants and establishment of two new grants-in-aid were announced by the Nutrition Foundation, Inc., at the spring meeting of its Board of Trustees in Chicago.

These grants represent an appropriation of $206,300. They are: Harvard University, $41,500; Washington University, 15,000; Columbia University, 28,000; Oregon State College, 10,800; Vanderbilt University, 20,000; University of Rochester (2), 9,200; Institute for Medical Research, 1,000; University of Toronto, 30,000; University of Wisconsin, 6,000; Massachusetts General Hospital, 7,000; Cornell University, 10,500; Iowa State College, 6,000; University of Tennessee, 3,800; Johns Hopkins University, 2,500; Wayne University, 5,000; Food and Nutrition Board, National Research Council, 7,500, and Ontario College of Education, University of Toronto, 2,500.

Prudence Island Chosen For Foot-Mouth Study

Prudence Island, situated in Narragansett Bay, off Rhode Island, will apparently be the site of the proposed federal laboratory for the study of foot-and-mouth disease. An agreement to option a site on the island was signed recently by Secretary of Agriculture Charles F. Brannan.

This is the laboratory that nobody

wanted. Normally, a public works project is eagerly sought by every Congressman for his district. Not this one.

Because of the highly infectious virus, which is to be studied in the laboratory, not one state would grant permission to build it within its boundaries. Finally, Congress had to select an island.

Prudence is located approximately half way between the city of Providence and the mouth of the Bay. It was one of the few sites conforming to restrictions laid down by Congress.

Building of the laboratory was spurred by the existence of the foot-and-mouth disease in Mexico. A joint U.S.-Mexican Commission has been slaughtering and vaccinating cattle and other cloven-hoof animals since 1946. The disease at present has no effective anti-toxin or really effective vaccine. Hence the need for research and the laboratory.

Cook Book Checklist

Helen Lee Mason, culinary consultant, author and reviewer of cook books is compiling a check list of all cookery and recipe books, booklets and pamphlets now available and in print. She would appreciate full information about cookery publications, especially locally published ones, and seeing copies of both books and booklets. These may be published by regular publishers, magazines, newspapers, commercial organizations, service groups, government agencies or individuals. Address Helen Lee Mason, 110 Highland Place, Ithaca, N. Y.

Schedule of Events

August

7– 9—International Apple Assn., 56th annual convention; Statler Hotel, Washington, D. C.
7–19—First International Trade Fair; Coliseum and Navy Pier, Chicago.
14–25—University of Colorado, short course in statistical quality control; College of Engineering, Boulder, Colo.

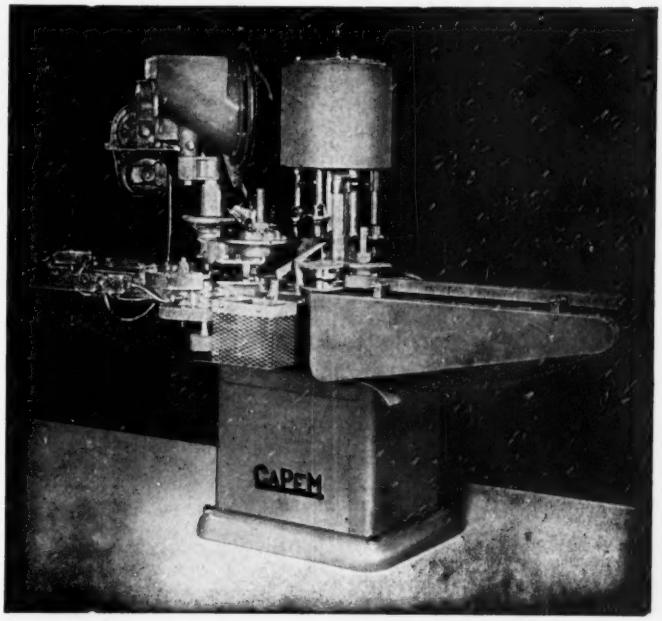
September

5– 9—American Chemical Society, Chicago Section, 6th national chemical exposition; Coliseum, Chicago.
10–13—National Frozen Food Locker Assn. and Frozen Food Locker Institute, joint convention; Palmer House, Chicago.
23–26—Packaging Machinery Manufacturers Institute, 18th annual meeting; The Homestead, Hot Springs, Va.
29–Oct. 3—American Meat Institute, 45th annual meeting; Palmer House, Chicago.

—End

CAPEM

THE MODERN SCREW CAPPER

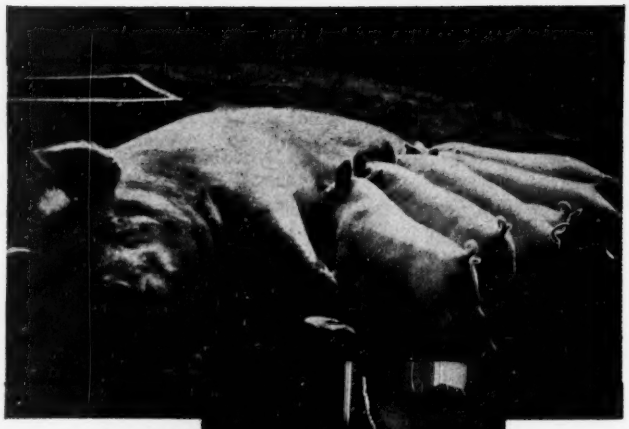


- Applies any type of standard screw cap or cover at speeds of 2000 to 10000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
- Delivers a perfect, LEAKPROOF seal at low cost.
- Available in 1, 2, 4, 6 and 8 spindle models.

Write for prices and delivery.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

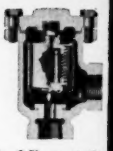
NATURE *Insists* ON INDIVIDUAL TRAPPING



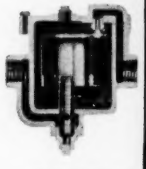
—and no waiting! But in your plant there may be slow-ups and other production headaches because a single large steam trap is supposed to drain a whole battery of machines or a number of individual coils or jackets.

Use individual trapping—a separate trap on each unit and make sure that condensate is not held back to slow up your operation.

THE SELECTION of the right steam trap is not difficult. Sarco Selection Chart No. 1600 shows first and second preference for standard applications, or the Sarco man will study and recommend for every process in your plant.



No. 9 Thermostatic Traps on Ovens



Bucket Traps on Fatty Acid Tanks

Float Thermostatic Traps on Dryer

Low Pressure Thermostatic on Heating System

253

SARCO SAVES STEAM

SARCO COMPANY, INC.

Represented in Principal Cities

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SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

Changes in Food Supplies

Stocks

Canned Fruits and Vegetables in canners' hands May 1, compared with same date a year ago, were reported by the National Canners Association as follows:

	Actual Cases (000 omitted)	
	1949	1950
Peas	6,376	3,268
Sweet Corn	7,957	12,485
Tomatoes	4,736	3,540
Tomato Juice	9,464	6,835
Beets	262	1,545
Lima Beans	241	1,768
Green and Wax Beans	937	3,198
Carrots	828	735
Red Pitted Cherries	60	277
	(Basis 24/2½'s)	
Peaches	4,765	4,291
Pears	1,066	1,059
Sweet Cherries	85	414
Apricots	1,837	740
	(Dozens)	
Baby Food	47	46

Production

MARGARINE production during April totaled 51,815,000 lb., which was 13,271,000 lb. below April, 1949 and 4,838,000 lb. under the 1945-49 average for the month.

ICE CREAM produced in April reached an estimated 40,970,000 gal., 8 percent under the previous April, and 12 percent smaller than the 1944-48 April average. The March-April increase was only 7 percent compared with 9 percent the previous year and a five-year average rise of 19 percent.

CREAMERY BUTTER output in April was estimated at 127,895,000 lb., 3 percent higher than April, 1949, and 13 percent larger than the 5-year average for April. March-April increase was only 5 percent, compared with 11 percent last year and 10 percent in the 5-year average.

AMERICAN CHEESE production for April was 84,645,000 lb., 3 percent less than April, 1949, but 12 percent above the 5-year average. March-April increase of 19 percent, compared with 22 percent in both 1949 and in the 5-year average.

LIQUID EGG production totaled 112,854,000 lb., in April, an increase of about 1 percent over April, 1949, but 22 percent under the 5-year April average of 143,961,000 lb.

DRIED EGG output came to 12,987,000 lb. in April, compared with 13,377,000 lb. produced in April, 1949.

FROZEN EGG production in April was about 1 percent under April, 1949, reaching 64,218,000 lb. This output was about 25 percent less than the 5-year April average of 86,120,000 lb.

NONFAT DRY MILK SOLIDS produced in April came to 97,150,000 lb., 1 percent below April, 1949, but 40 percent above the 5-year April average.

DRY WHOLE MILK production during April totaled 10,550,000 lb., 14 percent under April, 1949, and 36 percent below the 5-year April average.

POULTRY canned or used in canning during April reached 10,715,000 lb., 15 percent above April, 1949, but 9 percent below the 5-year average for the month.

MALTED MILK POWDER produced in 1949 declined from the preceding year for the third consecutive time. The total of 25,369,000 lb. was 19 percent less than the 1948 output and 41 percent under the 1943-47 average.

CHICKS hatched in April reached a total of 283,896,000, a drop of 6 percent from April, 1949 and 11 percent below the 1944-48 April average.

SPINACH packed in 1949 amounted to 6,740,525 cases on a 24/2's basis in the National Canners Assn. compilation. Production on the same basis in 1948 was 4,989,290 cases.

Indexes

Business Week's index of business activity rose to 211.4 for the week ending June 10, compared with 210.2 for the previous week, 206.3 a month earlier, and 185.8 a year earlier.

The commodity index on foods, compiled by the *New York Journal of Commerce*, stood at 179.9 for the week ending June 16. For the previous week it was 183.3; for May, 179.9, and for June 1949, 186.5.

CONSTRUCTION

	Pending (thousands)	Awarded June (thousands)	Awarded Total 1950 (thousands)
Bakery	$2,300	$800	$5,238
Beverages	200	100	6,337
Canning and Preserving	.....	275	675
Cold Storage	85	.....	705
Confectionery	418	150	518
Grain Mill Products	1,686	153	14,854
Ice, Manufactured	.....	.....	70
Meats and Meat Products	.....	.....	3,320
Milk Products	2,918	461	3,255
Miscellaneous	1,011	1,217	17,682
	$8,618	$3,156	$52,654

Golden State Company, Ltd.
SAN FRANCISCO STORAGE PLANT

CUTS COSTS
Automatically with

Engineered
REFRIGERATION
NEW—Multi-Cylinder Booster System

Here is the newest in super-efficient refrigeration. This CP System maintains temperatures ranging from 5 to 15 degrees below zero in 10 huge freezer and chill rooms —11,000 sq. ft. in area!

- **Operating Time Cut in Half**
So efficient is the system that compressor operating time has been cut in half. A total of 80 HP is doing the work that formerly took 110 HP—and doing it better. Manual attendance has been reduced to such routine chores as oiling.
- **Two Stage System**
Two pairs of CP Boosters and Second Stage Compressors are used. Mercury switches start and stop compressors automatically—in routine or emergency conditions.

This entire system for fully automatic refrigeration was conceived and designed by Golden State's engineering department in co-operation with CP engineers.

Two pairs of CP Type K Boosters and Second Stage Compressors and Intercooler save time, power and space for Golden State.

Whether you need a refrigerant temperature of −60°F. or +60°F., you'll find a dependable answer in CP Type K Ammonia Compressors and Boosters. Let teamwork with CP Engineers help you to lower costs and greater profit. Check with CP now.

THE *Creamery Package* MFG. COMPANY

General and Export Offices:
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Pass those flavor tests consistently . . .

By holding the pH of treated water continuously and precisely "on the beam", Foxboro Automatic pH Control goes far towards maintaining product uniformity—easily, economically and with consistent regularity. It never forgets . . . never tires . . . never makes a mistake.

Unlike any other instrument for pH control, the Foxboro Dynalog* Electronic Controller has no batteries (hence no standardizing), no galvanometer, no slidewire, no moving contacts, no high-speed motor, no gears. It's the easiest potentiometer to maintain ever built.

Designed to take full advantage of electronic circuits, Dynalog Instruments offer an unequalled combination of sensitivity, speed, accuracy and simplicity. Unique, STEPLESS capacitor-balancing assures positive response to the smallest change in pH values. Used with Beckman Glass Electrodes.

Automatic pH control is only one of many Foxboro precision-built controls for the food industry. Ask your nearby Foxboro engineer about their special advantages.
The Foxboro Company, 268 Neponset Ave., Foxboro, Mass., U. S. A.

*Reg. U. S. Pat. Off.

with this AUTOMATIC pH CONTROL

FOXBORO
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Instruments that Improve Product Uniformity

Men, Jobs, Companies

RAYMOND POWERS has been named director of laboratories for Borden Co.'s manufactured products division. He served as assistant director to quality control expert Ernest C. Thompson for 4 yr.

CHARLES W. FROELICH has been appointed vice-president in charge of all plant operations for Hunt Foods, Inc. Starting as a plant electrician in 1919, he has worked up through all company's operations.

JOHN M. HANCOCK, a leading American industrialist and formerly of Jewel Tea Co., has been elected chairman of board of Lever Bros. Co. Jervis J. Babb has become president in an executive re-alignment.

CHARLES C. ANDERSON, Rear Admiral, USN (Ret.), has been appointed chief executive of Wilson & Co.'s engineering department. He recently headed Navy's Industrial Managers Office, Chicago. (Glogau photo)

Industry

Birds Eye-Snider Div., General Foods, has acquired new packing plant facilities in Waseca, Mapleton and Madelia, all in Minnesota. Plants are chiefly for processing of quick-frozen peas. Operations started in June.

Borden Co.'s Farm Products Div. has advanced B. H. Detwiller to vice-president in charge of pasteurizing plants. Other promotions include Matt T. Daly to vice-president in charge of marketing, William F. Duemmel to vice-president in charge of sales, and Edward J. Brennan to general sales manager.

Clinton Foods, Inc., has purchased the Northern Idaho Frozen Foods plant at Lewiston. This is company's first plant for processing quick-frozen vegetables, and other frozen foods except juices.

Feuchtenberger Bakeries, Inc., Bluefield, W. Va., has taken over the Hailship Baking Co., Logan, W. Va.

Henderson Sugar Refinery, Inc., plans construction of a large refinery at New Orleans to handle 300,000,000 lb. of sugar a year.

International Packer, Ltd., new food packing firm, has been chartered in Delaware. Capital: $30,000,000.

Jekyll Island Packing Co. plans construction of a $3,000,000 shrimp freezing and packing plant on the East River near Brunswick, Ga.

The Kellogg Co., Battle Creek, Mich., will build a large cereal plant at Queretaro, Mex.

The Midwest Dairy Corp., Chicago, now owns Jersey Gold Creameries, Shreveport, La. About $1,000,000 was involved in sale.

National Coffee Assn. has appointed W. F. Williamson executive vice-president in move to improve handling of increasingly complex problems of trade.

National Independent Meat Packers Assn. announces its 1950 officers: Fred J. Dykhuizen, Dixie Packing Co., chairman of board; C. B. Heinemann, president and secretary; Fred J. Clark, Tobin Packing Co., first vice-president; John E. Thompson, Reliable Packing Co., treasurer.

National Meat Canners Assn. has elected C. L. Nelson, Libby, McNeill & Libby, as president at its 27th annual meeting in Chicago.

New England Mfg. Confectioners Assn. elected Richard W. Clare, New England Confectionery Co., to presidency at its annual meeting in Boston. Other officers are C. E. Worthen, vice-pres.; William O. Wallburg, treasurer; Harry Gilson, secretary; and Kenneth P. Miner, Richard D. Muzzy, Stephen Rich, directors.

Roselyn Bakeries, Inc., has begun construction of a $200,000 bakery plant in Indianapolis, where it has twelve outlets.

Seven-Up Co. has formed an Amarillo, Tex., bottling company, and placed Mike Fitzpatrick in charge as general manager.

Sierra Candy Co. plans immediate construction of a $1,000,000 plant in San Francisco.

Southern Bakers Assn. elected Earle P. Colby, Ambrosia Cake Bakers, as president at its 36th annual convention in St. Petersburg, Fla. E. P. Cline was re-appointed secretary-treasurer.

White Baking Co. will erect a $275,000 addition to its Dayton, Ohio, plant. Another $100,000 will be invested in baking machinery and transportation equipment.

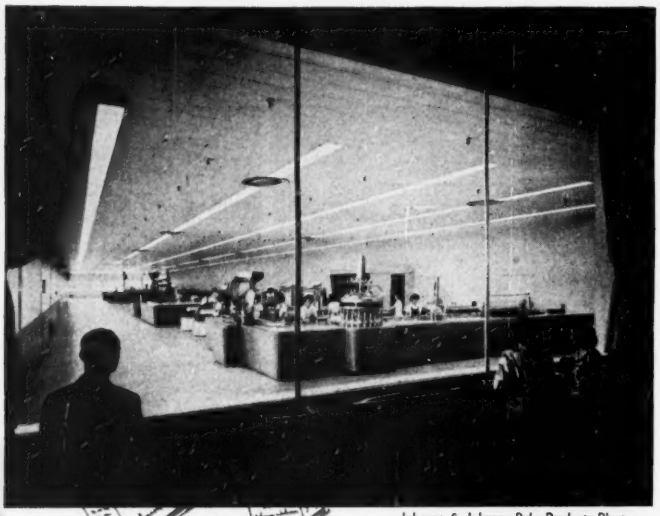
Personnel

W. M. Duke has been transferred to Ocala, Fla., as manager of Swift & Co.'s packing plant there.

W. M. Elder has been appointed general manager of all canned food and sausage operations of Armour & Co. G. W. Munro will assist him. H. D. Morris becomes manager of canned food department.

Leonard M. Green is new president of Dr. Pepper Co., succeeding Don C. Bryan, resigned due to illness.

Porter I. Henderson has been retained to conduct dairy usage service work for American Dry Milk Institute.



Johnson & Johnson Baby Products Plant
Cranford, N. J.

Modern production methods ... fire protection

Noted for the streamlined beauty and functional perfection of its manufacturing facilities, the Johnson & Johnson Baby Products Plant at Cranford, N. J., carries modernity of construction one step farther through the provision of absolute fire safety by means of *"Automatic" Sprinklers*

The provision of safety to life and property has for years been the primary aim of the J & J management, and *"Automatic" Sprinkler* protection has past proved its fire combatability. It stands ready at all times to give instant effective action at the first indication of flame. Because of this speedy detection, fires in sprinklered properties are usually extinguished in their infancy with but few sprinklers in actual operation, consequently little or no water damage is sustained.

Of further important consideration is the fact that approved *"Automatic" Sprinkler* installations allow for savings of upwards to 90% in insurance premiums and, like any other capital asset, can be amortized over a given period of years, with their initial cost ultimately taken as an operating expense.

Let one of our fire protection engineers show you how to *save lives ... save property ... and save money with "Automatic" Sprinklers.*

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

"Automatic" Sprinkler
FIRST IN FIRE PROTECTION
DEVELOPMENT . ENGINEERING MANUFACTURE . INSTALLATION

DANIEL M. DENT, general manager of Borden Co., was elected president of Associates, Food & Container Institute at annual convention in Louisville. He succeeds Berton S. Clark, American Can Co., who was named chairman of board. Other officers are H. S. Mitchell, vice-chairman of board; A. L. Elder, executive vice-president; V. R. Johnston, vice-president; and F. N. Peters, treasurer.

Merrill G. Koser has been appointed Eastern Div. general manager for Fairmont Foods Co. John W. File succeeds him as manager of Buffalo plant.

Franklin J. Lunding, president of Jewel Tea Co., Chicago has been engaged as a director of Lever Bros. to help rebuild management.

Harvey K. Murer has been appointed manager of General Foods Corp.'s Central Laboratories in Hoboken, N. J. Roy H. Walters, director of engineering research there, has been transferred to New York office as technical assistant to director of research and development.

Edward M. O'Conner, has been made executive vice-president and general manager of Borden Co.'s Soya Div. plants at Waterloo, Iowa, and Kankakee, Ill.

H. W. Putnam has begun duties as Research Director of Ballard & Ballard Co., Louisville, Ky.

Richard H. Randall has been chosen to head the newly-created special packages division of Crosse & Blackwell Co., Baltimore.

Henry J. Reynolds, who has done poultry processing research for Armour & Co. for 25 yr., has now become process manager for Piedmont Poultry Co., Gainesville, Ga.

Lloyd K. Riggs has been appointed director of newly formed Nutrition & Biochemistry Div. of National Dairy Research Laboratories, Inc., Oakdale, Long Island, N. Y.

Arthur L. Sanders has been chosen as general manager of new Tetley Tea Co. plant in Savannah, Ga.

Ellen Semrow has been appointed director of Consumer Service Dept. of National Assn. of Margarine Manufacturers.

Richard W. Sidenberg has been named Northeast Div. manager for Hines-Park Foods, Inc.

E. E. Stewart has been named executive vice-president of National Dairy Products Corp., and Paul Miller has been elected a vice-president.

A. G. Versen has been appointed general manager of Armour & Co's Chicago plant. F. W. Trenkle is his assistant.

William P. White has been named manager of modernized Savannah plant of Foremost Dairies.

Herbert S. Wilgus has become director of nutrition and research for Peter Hand Foundation, division of Peter Hand Brewery Co., Chicago.

John Yeager, formerly oils and fats chemist, Cudahy Bros., has become a member of product control staff of Oscar Mayer & Co., Madison, Wis.

Associated Industry

American Can Co. is starting construction of a $5,000,000 plant at Chatham, Ont., which will have annual capacity of 300,000,000 cans. M. P. Cortilet has been made a vice-president in charge of U. S. central division sales.

Cannon Chemical Co. has elected Richard W. Moulton executive vice-president. Formerly with Howard D. Johnson Co., he will be retained by latter on consulting basis.

Continental Can Co. has elected General Lucius D. Clay as chairman of board, replacing Carle C. Conway, resigned.

Leeds & Northrup Co., Philadelphia, has opened a sales and service office in Seattle.

Merck & Co., manufacturing chemists of Rahway, N. J., has elected James

THE NORTHERN PACIFIC TRANSPORT COMPANY

. . . a very prominent western transportation company, operates a large number of motorized vehicles in the states of Montana and Washington. The operation of their equipment is extremely severe due to mountain grades and wide temperature variations.

They say . . . . "THIS LUBRICANT CUT OUR PARTS REPLACEMENT 50%"

Quoting from their letter of October 17, 1949:

"We ran our first test on LUBRIPLATE #22 in March, 1945, in 3000 series Timken tandem-drive, worm axles. That year we experienced considerable trouble with wartime drivers and very poor roads, causing us no end of trouble. The oil that we were using set up to tar in 10 to 15 thousand miles. The LUBRIPLATE #22 proved so satisfactory we installed it in all our worm-gear, hypoid, and two speed axles. This enabled us to change our oil-change period from 15,000 miles to 40,000 and on some applications, depending on speeds and temperatures encountered, we raised the change period to 60,000 miles, or approximately once a year. Our overhaul periods were stretched from 50,000 to 100,000 miles, and repair parts bill cut 50% with the increased mileage."

Naturally with the economies that this company enjoyed through the use of LUBRIPLATE Lubricants on worm-axles, they extended the use of LUBRIPLATE to other parts of their equipment. The savings in parts, time, money and increased efficiency are equally startling. Let us send you the entire report of where they are now using LUBRIPLATE and what it is saving them.

LUBRIPLATE Lubricants will prove just as effective for you in your plant in reducing friction and wear. They are different from any other lubricants you have ever used. They save power, prevent rust and corrosion and definitely arrest progressive wear.

LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases. There is a LUBRIPLATE Product best for your every lubrication requirement. Let us send you CASE HISTORIES of savings that others in your industry are making through the use of LUBRIPLATE Lubricants. Write today.

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Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio

DEALERS EVERYWHERE . . . CONSULT YOUR CLASSIFIED TELEPHONE BOOK

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Guardians OF THE NATIONS FOODS

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Four Modern Fortresses For Guarding The Nation's Foods

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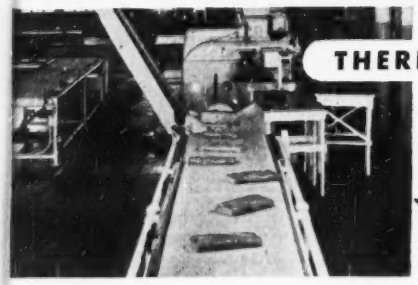
ZONE 1



THERE'S A JOB FOR SUPRENE BELTING

Wherever Food Is Processed

Whether you're processing fruit, vegetables, fish or meat, SUPRENE's the answer to your belting problem. SUPRENE is strong . . . thanks to heavy, tightly-woven duck, Neoprene-impregnated. It's waterproof, stable and durable. It withstands extremes of temperature . . . from below zero to 250°F. It's available in four styles, a variety of thicknesses and in widths up to 48-in. and can be furnished endless. Most important of all to you as a food packer, SUPRENE is completely sanitary. The special impregnation is highly resistant to vegetable, mineral and fruit acids and oils. Hot water or live steam can be used to wash the smooth surface quickly and completely. What's more, there's no danger of particles of belting checking off. Investigate SUPRENE. It's ideal for all food service. Send for bulletin.

Victor Balata & Textile Belting Co.
53 Park Pl., N.Y. 7 • 300 S. W. Hubbard St., Chicago 10
Factory: Easton, Pa.

LOWELL O. GILL has been appointed technical director of A. E. Staley Mfg. Co., Decatur, Ill. Formerly assistant technical director, he succeeds Howard File, who resigned because of poor health.

J. Kerrigan president. He succeeds G. W. Merck, who continues as chairman of board.

National Starch Products Inc., New York, has acquired all formulas, manufacturing procedures, and dextrine accounts of Arnold, Hoffman & Co., Providence, R. I.

Package Machinery Co., Springfield, Mass., has been granted exclusive rights for importation and sale of confectionery equipment made by Hansella Works, Viersen, Germany.

Potter Instrument Co. is transferring operations to its newly constructed plant in Great Neck, Long Island, N. Y.

Deaths

Joseph W. Milner, president of Coast Coca-Cola Bottling Co. and past president of American Bottlers of Carbonated Beverages—during April.

Charles S. Northen, 81, widely known scientist and food chemist—May 18 at Ocala, Fla.

Andrew Preiser, 70, vice-president and master brewer, Koller Brewing Co., Chicago—Apr. 5.

Alfred J. Schedler, 81, chief brewing technician, Pabst Brewing Co., Milwaukee—Apr. 24, of a heart ailment.

Dodge Taylor, 48, chairman of Florida Citrus Commission—May 13 of a heart attack.

—*End*

POWDERS

TABLETS

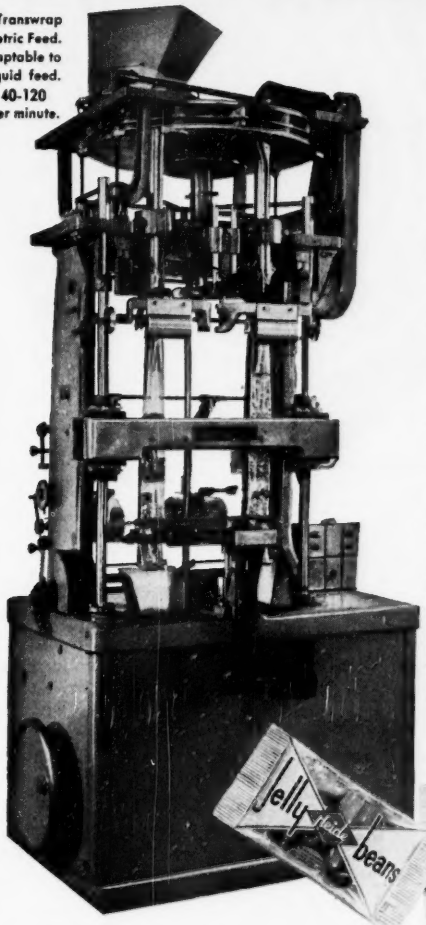
FREE FLOWING SOLIDS

LIQUIDS OR SEMI-LIQUIDS

TRANSWRAP

AUTOMATICALLY COMBINES MINIMUM PACKAGE COST WITH MAXIMUM VERSATILITY

Model "B" Transwrap with Volumetric Feed. Also adaptable to auger or liquid feed. Produces 40-120 pkgs. per minute.



In one machine, TRANSWRAP is a self-contained "packaging department." Using cellophane, Pliofilm, glassine, roll foil or other suitable heat-sealing materials, it forms, fills and seals your package completely automatically.

The same TRANSWRAP machine with suitable feed assembly can package 1 aspirin tablet or 1 lb. of peanuts . . . 1 teaspoon of vanilla extract or 1 lb. of margarine . . . 5 grams of salt or 16 oz. of powdered milk. Package sizes possible range from 7/8" x 2" to 5¼" x 13". They may be either pillow, or "fin seal" type (sealed around four edges).

From the standpoint of economy, TRANSWRAP adjustments and operation are so simple, a single operator can handle a whole battery of machines. Attractive, sales-conditioned TRANSWRAP packages, *filled and sealed*, actually cost less than ready-made *empty* bags.

Custom-engineered adaptations are possible on any TRANSWRAP machine to meet your individual requirements with maximum efficiency.

WRITE FOR FREE ILLUSTRATED BROCHURE

Manufactured and Sold by

TRANSPARENT WRAP MACHINE CORPORATION

Route 17 and Henry Street
Hasbrouck Heights, New Jersey

Getting down to cold facts

PRODUCT: Soft drink dispenser cold plate.

COOLING COIL: ELECTRUNITE Stainless Steel Tubing...Type 304; Size ¼"; Gauge 20.

COIL FABRICATOR: Steel and Tubes Division.

FABRICATING TOLERANCES: Between fittings —.005".

REMARKS: Your inquiries for fabricated assemblies receive expert attention of experienced personnel.

Well known to the food and beverage industries are the advantages of ELECTRUNITE Stainless Steel Tubing . . . *cleanliness* . . . *sanitation* . . . *long service life* . . . because it is made of Republic ENDURO Stainless Steel.

In this application, the fabrication story is both unusual and interesting. Because the finished coil is cast in a solid metal plate, which fits into the bottom of the fountain dispenser, absolute alignment of fittings and coil is a must requirement. Quite frankly, this was not a simple job —even for Steel and Tubes' experienced fabricating men. Only after painstaking work with jigs, bending tools and spot welding cycles, were they able to overcome all of the problems involved.

All of which adds up to one very important point: whether you require plain straight tubing, in carbon or stainless steels, or fabricated tubular assemblies of any description, it pays to come *first* to the leader of the welded steel tubing industry . . . Steel and Tubes. For prompt help with *any* tubing problem, write, wire or phone:

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STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic
REPUBLIC STEEL
ELECTRUNITE
STAINLESS STEEL TUBING

Books

Employee Pensions

HOW TO PLAN PENSIONS. *By Carroll W. Boyce. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1950. 479 pages; 6 x 8¼ in.; cloth. Price, $5.*

The whole subject of pensions is likely to cause a great many headaches before the issue is firmly settled for either small or large business organizations. And food manufacturers will be no exception.

This book provides the most complete background yet offered on the subject. With data gathered from many sources, the book brings together all phases of the problem. Despite this comprehensive approach, the author and his associates have held the information to nontechnical terms, outlining only the practical applications of such technical problems as are involved.

The book covers, at adequate length, the pension aspects of collective bargaining, costs, and emotional involvement of workers. It is a volume that the personnel department of every food plant will want to study, then pass right along to top management.

Smoked Fish Production

THE TORRY RESEACH STATION CONTROLLED FISH-SMOKING KILN. *By C. L. Cutting. Published by His Majesty's Stationary Office, York House, Kingsway, London, W. C. 2, England, 1950. 16 pages; 6 x 9½ in.; paper. Price, 1s. 6d.*

In an effort to overcome the unevenness in the cure of smoked fish, this British research station undertook studies on a mechanical kiln that controlled temperature and humidity, as well as the density and distribution of smoke. This report describes the successful results with ¼ ton and ¾ ton models.

The booklet also provides enough detail to permit construction of similar models.

Earthy Science

AGRICULTURAL CHEMISTRY, VOL. 1. *Edited by Donald E. H. Frear. Published by D. Van Nostrand, Inc., 250 Fourth Ave., New York, N. Y. 1950. 812 pages; 7 x 9 ¾ in.; cloth. Price, $9.*

As a general reference text covering the broad scope of agricultural chemistry, this first section of a two-volume book, attempts the more fundamental phases. Included are the chemistry of biologically important basic compounds and the physiological processes of plants and animals.

Twenty-four chapters have been prepared by recognized specialists, and each should provide the industrial chemist or advanced student with a good general understanding of the subject discussed. Chapters of particular interest to the food chemist are grouped in Parts I and II under the general titles "Some Fundamental Materials and Processes Common to Plants and Animals" and "Chemical Processes of Fundamental Importance in Agriculture."

A second volume, devoted to the practical applications of agricultural chemistry, is expected sometime in 1951.

New Flour Grind

UNIFINE FLOUR. *Published by The State College of Washington, Pullman, Wash., 1950. 40 pages; 8½ x 11 in.; paper. Free.*

To those who have been curious about Unifine flour, this bulletin will be most welcome. This exceedingly fine flour, ground from the entire wheat berry, has been under study by Washington State's industrial research division and the State Agricultural Experiment Stations for more than a year. Found highly successful in bread baking, the new flour has also proved acceptable in the limited consumer tests that have been made.

While studies are continuing, this report offers experimental data obtained on the mills producing the flour, on various aspects of the flour itself, and on the consumer tests that have been conducted.

Chemical Data

CHEMICAL ENGINEERS' HANDBOOK, *3d Edition. Edited by John H. Perry. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1950. 1,942 pages; 7½ x 10¼ in.; leather composition. Price, $15.*

If you are not at least acquainted with one of the earlier editions of this very extensive compilation of data on the theory and practice of chemical engineering, then it is likely that you have no need for this one. This edition has been thoroughly revised and expanded to include developments of the past nine years.

As in the previous two editions, the

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OIL BITTER ALMOND FFPA
Imported from France
FREE FROM PRUSSIC ACID
A product guaranteed for its purity and uniformity . . . suitable for all your requirements.
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Highly concentrated water miscible flavors ready for use "as is"
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Better Sanitation

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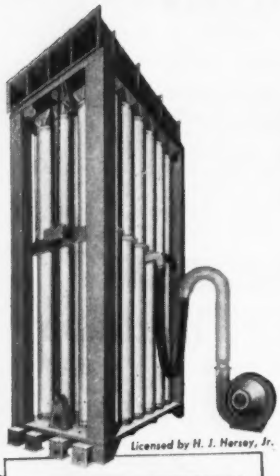

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DAY
Type A.C.
DUST FILTER

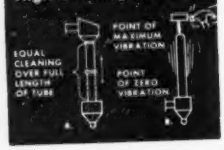
New highs in plant cleanliness are being achieved by food processing plants using **DAY** Type A. C. Dust Filters because all parts have been specially designed for better sanitation.

From inlet to outlet, **DAY** Filters have no flat surfaces or ledges for dust to accumulate and become contaminated. This feature is especially important in food processing where maximum cleanliness and elimination of bacteria are essential.

The **DAY** Filter is engineered to give higher cleaning efficiency and continuous-automatic operation with constant air volumes. The gentle, yet positive continuous cleaning action of reverse air jet rings permits the use of a high grade felt filtering fabric which collects even the finest dust particles. This high grade filtering material also allows greater air-to-cloth ratios. (Actual installations are operating successfully with air-to-cloth ratios of 15 or 20 to 1.)

The reverse air jet mechanism provides uniform cleaning over the entire length of the tubes, and operates with a maximum cloth area loss of only 1¼%. Air volumes remain constant and there are no cleaning shutdowns to cause high back pressures and sharp air volume variations.

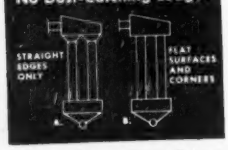
High Cleaning Efficiency



A. In **DAY** Filters, reverse air jet rings move continuously up and down effectively cleaning the full length of each tube.

B. In filters requiring violent rapping, cleaning effectiveness varies widely from point of vibration to point where cloth is fastened to filter.

No Dust-Catching Ledges



A. DAY Filters have no flat surfaces or ledges where dust can collect and become contaminated.

B. Most other dust filters have flat surfaces and ledges which collect dust and encourage infestation.

OTHER IMPORTANT ADVANTAGES

- **SEPARATED DUST STREAMS**—One **DAY** Type A. C. Filter can handle several different product streams simultaneously *without mixing.*
- **ECONOMICAL**—You save money because you need less filter to handle equal volumes of air. Less floor space required. Simple, rugged construction gives years of dependable operation with minimum maintenance.

Write-to-DAY for Bulletin 491.

DAY SINCE 1881

The **DAY** *Company*

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Branch plants in Ft. Worth, Buffalo and Welland, Ont.

book provides data required for routine problems of design and practice as well as data needed for investigation of special problems.

You could get a fine argument rolling, however, on whether a volume of this size and weight should be called a handbook.

Enzyme Research

ADVANCES IN ENZYMOLOGY, *Vol.* 10. *Edited by F. F. Nord. Published by Interscience Publishers, Inc.,* 215 *Fourth Ave., New York* 3, *N. Y.,* 1950. 533 *pages;* 6¼ x 9¼ *in.; cloth. Price,* $7.50.

Appearance of this tenth volume will be notable to those maintaining this valuable series. The edition, however, has little that will be of direct interest to the food chemist.

Government Publications

UTILIZATION OF FARM CROPS, FATS AND OILS. *Senate Report No.* 1374 *of Committee on Agriculture & Forestry.* This report resulted from hearings on resolution "authorizing an investigation relative to expanded uses of farm crops." It deals with fat and oil surpluses and problems of expanding use.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, *D. C. When no price is indicated, the pamphlet is free and should be ordered from the Bureau responsible for its issue.*

FOOD CONSUMPTION OF URBAN FAMILIES WITH CHILDREN AND OF FAMILIES WITH NO CHILDREN. *Bureau of Human Nutrition & Home Economics,* 1948 *Food Consumption Surveys Preliminary Report No.* 14, *FE* 844. *Mimeographed.*

CONSUMPTION OF FLUID MILK AND CREAM IN NORTHEASTERN MARKETING AREAS. *Bureau of Agricultural Economics, March* 1950. *Mimeographed.*

EXPORT OUTLOOK FOR UNITED STATES FATS, OILS, AND OILSEEDS IN SELECTED EUROPEAN COUNTRIES. *By L. J. Norton. Office of Foreign Agricultural Relations, Foreign Agriculture Report No.* 44. *Mimeographed.* A statistical summary and forecast.

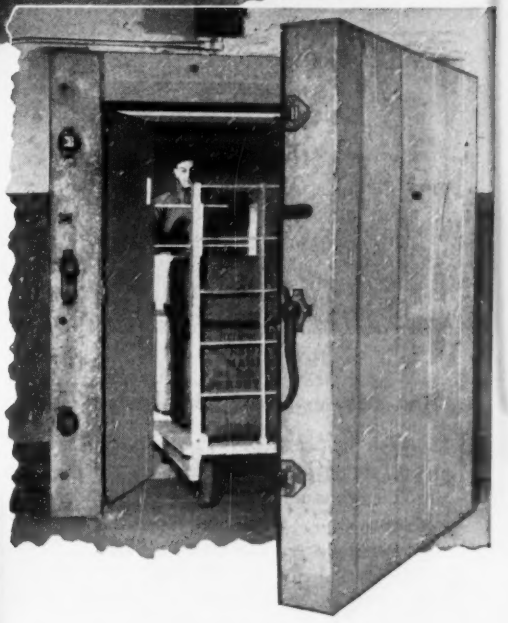
DAIRY PRODUCTS IN CITY DIETS. *Bureau of Human Nutrition and Home Economics, Commodity Summary No.* 6. *Mimeographed.* —*End*

LARGE OPENINGS PERMIT USE OF TRUCKS

Speedy handling in and out of storage is possible by use of trucks that pass in and out of the large openings equipped with equally large Jamison-built doors.

FROZEN ORANGE JUICE COMING FROM -10° F.

The vestibule doors swing open to leave a truck load of frozen orange juice pass through. The overlap type Super Freezer Door is metal clad and is equipped with two Jamison E-Z-Open Fasteners.

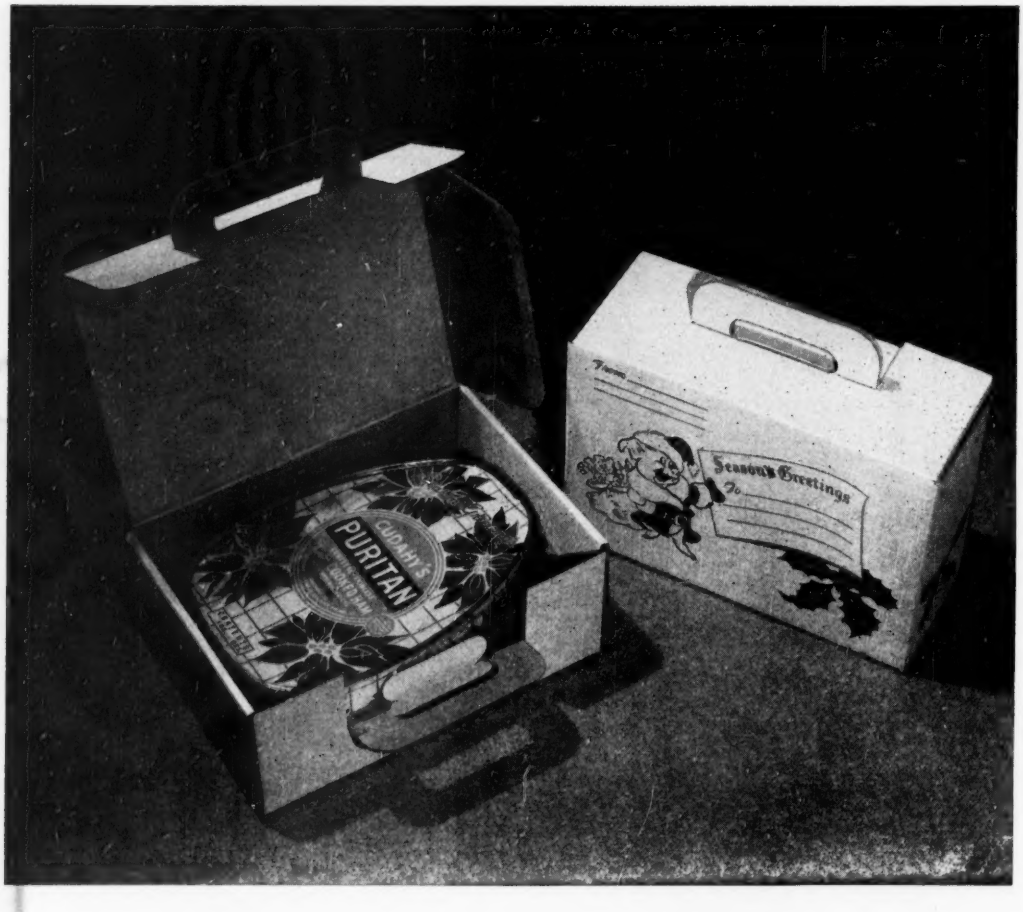


JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

The oldest and largest builder of cold storage doors in the world

JAMISON COLD STORAGE DOOR CO. • HAGERSTOWN, MD., U. S. A.

Creative Package Design



this corrugated "luggage" box

Displays the product . . . suggests itself as a gift . . . prompts the purchase . . . simplifies the sale . . . encourages "take-with" buying . . . eliminates repacking and rewrapping . . . offers re-use value . . . is adaptable to mailing. Give your product package action to make it stand out above competitive merchandise. Consult Hinde & Dauch, Executive Offices, 5004 Decatur St., Sandusky, Ohio.

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Authority on Packaging

DO YOU MANUFACTURE GIFT ITEMS? Write for colorful, beautifully illustrated booklet, "Setting the Stage for Holiday Merchandising," outlining the secrets of increasing sales through corrugated gift boxes.

FACTORIES AND SALES OFFICES IN: Baltimore • Buffalo • Chicago • Cleveland • Detroit • Gloucester, N. J. • Hoboken, N. J. • Kansas City, Kan. • Lenoir, N. C. • Richmond, Va. • Sandusky, Ohio St. Louis • Watertown, Mass. **SALES OFFICES IN:** Akron • Battle Creek • Cincinnati • Columbus • Denver • Erie, Pa. • Fairfield, Conn. • Findlay, Ohio • Greensboro, N. C. • Indianapolis • Miami Minneapolis • Olean, N. Y. • Omaha • Philadelphia • Pittsburgh • Reading, Pa. • Roanoke, Va. • Rochester • Toledo • Worcester, Mass. **IN CANADA, HINDE & DAUCH PAPER CO. OF CANADA, LTD.,** Toronto • Montreal • Chatham • Calgary • Halifax • Hamilton • Kitchener • London • Peterborough • Quebec • Regina • St. John, N. B. • St. John's, Newfoundland • Vancouver • Winnipeg

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Food Plant Equipment

Steam, Air, Gasoline Traps A

Thermostatic steam traps for pressure up to 225 psi., expansion steam straps up to 250 psi., and weight-operated traps for steam, air and gasoline for pressures up to 1,500 psi. are presented in 32-page Catalog 250. Capacity tables, installation diagrams, and charts and formulas for determining proper size trap are included.—*W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.*

Sewage and Trash Pumps B

Vertical and horizontal shaft, non-clog sewage and trash pumps are illustrated in 16-page Bulletin 5410-7. Both shafts come in sizes 2 to 20 in. Vertical shaft can be furnished for either wet or dry pit installation; horizontal pumps are available for direct drive or belted service.—*Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5.*

Processing Equipment C

Complete line of evaporators, atmospheric and vacuum dryers, solvent recovery and distillation equipment, and kettles are pictured in 28-page Bulletin 349.—*Buffalovak Equipment Div., Blaw-Knox Co., 1575 Fillmore Ave., Buffalo 11.*

Meat Packing Equipment D

Wide range of supplies, equipment and machinery for the meat industry is presented in 68-page Catalog 75.—*Koch Supply Co., 20 & McGee St., Kansas City 8, Mo.*

Hydraulic Presses E

For any operation requiring controlled pressures from 1 to 35 tons, new hydraulic "Multipress" is recommended. Working components are described in 16-page booklet.—*The Denison Engrg. Co., Columbus 16, Ohio.*

Steel Boiler Tubes F

Technical data on electric-resistance-welded steel boiler tubes are given in Bulletin TB-331. Tables are furnished on maximum allowable working pressures and for determining weight of tubes in various minimum wall sizes.—*Babcock & Wilcox Tube Co., Beaver Falls, Pa.*

Transmission Couplings G

Construction features and installation of "Airflex" transmission couplings are outlined in 8-page Bulletin 8100.—*Falk, 50 Church St., New York 7.*

Roller Mills H

Three 2-page leaflets describe 6x14-in. and 12x32-in. high speed three roll mills which offer both one- and four-point adjustment.—*Troy Engine & Machine Co., Troy, Pa.*

Cradle-Mounted Centrifugal Pumps I

New line of cradle-mounted centrifugal pumps, featuring comprehensive sectional views, is announced in 4-page leaflet. Sizes range from ¾ to 5-in. discharge, with capacities up to 1600 gpm. and heads up to 250 ft.—*Ingersoll-Rand Co., 11 Broadway, New York 4.*

High-Speed Synchronous Motors J

Working components and applications of "Tri-Clad" high-speed synchronous motors are given in 8-page Bulletin GEA-5426. Both 2- and 3-phase motors are covered in ratings from 20 to 1500 hp. at 60 cycle speeds of 1,800 rpm.—*General Electric Co., Schenectady 5, N. Y.*

Non-Electric Magnetic Separators K

Installation procedures for permanent non-electric magnets on feed chutes, attrition mills, knife cutters, roller mills, and hammermills are illustrated in 4-page Bulletin 11.—*Sprout-Waldron & Co., Inc., Muncy, Pa.*

Single-Stage Turbine L

Complete description and specifications of new single-stage, mechanical drive turbine suitable for pressures to 1,450 psig., initial temperatures to 950 deg. F., and back pressures to 300 psig., is contained in 4-page leaflet. Labyrinth shaft seal, consisting of shaft grooves and mating tongues of stainless steel packing, is reported to prevent leakage and hence reduce losses, while lasting longer and requiring less maintenance.—*De Laval Steam Turbine Co., Trenton 2, N. J.*

Vibratory Feeders M

Advantages claimed for magnetic and "vibra-flow" vibratory feeders are covered in 16-page photo pamphlet. Units can be employed as long conveyors, wide spreaders, and furnace feeders.—*Syntron Co., Homer City, Pa.*

Ovens and Incubators N

Redesigned line of ovens and incubators is described in 8-page Bulletin 376. Increased dimensions and improved baked-on green Hammerloid finish are among improvements.—*Precision Scientific Co., 3737 W. Cortland St., Chicago 47.*

Gas Unit Heaters O

Featuring cast iron heat exchangers, 4-page Bulletin 30-C-43 presents specifications for six sizes of gas unit heaters. Range is from 85,000 to 215,000 btu. per hr.—*Automatic Gas Equip. Co., 301 Brushton Ave., Pittsburgh 21.*

Small-Size Reducers P

Enabling 24 shaft locations, new small-size speed reducers use about half the space ordinarily required. Horsepower ranges from 1/20 to ½; reductions from 25:1 to 1764:1. Data is set forth in 4-page Bulletin HW 150.—*Winfield H. Smith Corp., Springville, N. Y.*

Selenium Rectifiers Q

Sizes, ratings and illustrations of line of metallic, dry plate selenium rectifiers are detailed in 4-page folder.—*Syntron Co., Homer City, Pa.*

Unit Air Conditioners R

For industrial plants and offices needing a cooling system of moderate capacity, new unit air conditioners are announced in 4-page Bulletin 522-A. Feature is ease of relocation.—*Frick Co., Waynesboro, Pa.*

Semi-Industrial Refrigerators S

New line of refrigerators, from 27 to 62 cu. ft. capacities, are pictured in 10-page book-

Quick-freezing Corn-on-the-Cob with Frick Refrigeration

The W. E. Bittinger Co. freezes cut sweet corn and corn-on-the-cob, as well as spinach, at its new plant in Hanover, Penna. Its Frick-Freezer handles 30,000 pounds of corn a day; its storages hold 40,000 pounds.

The New Quick-freezing Plant at Hanover, Penna.

One of Two Storage Rooms for Frozen Corn and Other Products

Another example of the effectiveness of Frick low-temperature refrigeration—used also in the world's largest quick-freezing plant.

For the solution of that particular air conditioning, quick-freezing, ice-making or refrigeration problem of yours, look to

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.
Also Builders of Power Farming and Sawmill Machinery

Four Frick Compressors at Hanover

We got a real buy in our BATTERY-ELECTRIC Trucks

"Just about a year ago, we decided something had to be done about our tough material-handling problems. We called in a Sales Engineer of one of the electric truck manufacturers for advice, and it wasn't long until we owned six new battery-electric trucks!

"Then things happened! We were able to cut our freight-unloading time 75%. In one of our departments we now handle material six times faster than we used to, and our cost-per-ton for handling all over the plant has been slashed! And do you know, our efficiency increase resulted in a lowering of the unit-cost of our product!

"Well, we could have done some of this with any industrial truck. But here's what we discovered with a battery-electric system.

"IT'S ECONOMICAL. Our operating costs run around 10¢ per hour per truck for everything—including repairs.

"IT'S DEPENDABLE. We have a very minimum of down-time with our trucks, and they're going strong 16 hours a day.

"IT'S SAFE. That electric truck-and-battery combination minimizes a fire hazard, and keeps our insurance rates down.

"IT'S FUME-FREE. Our men don't have to worry about operating in closed areas. Battery-electric trucks don't give off toxic fumes. No danger of product contamination.

"IT'S CLEAN. In our kind of business, cleanliness is important; and battery-electric trucks are *really* clean!

"IT'S A LONG-RANGE PROGRAM. Friend of mine told me his company has trucks in use that they've had for 22 years! And they're still good!

1923 1950

"Say, maybe you'd better look into *your* material-handling situation. I wouldn't be a bit surprised if you'd get the same satisfactory service and excellent results we did. Tell you what—write to The Electric Industrial Truck Association for their new 'Handbook of Material Handling with Industrial Trucks.' That'll give you plenty of information."

The Electric Industrial Truck Association

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let. Though designed primarily for retailers, specific uses in food plants are seen.—*Frigidaire Div., General Motors Corp., Dayton 1, Ohio.*

Air Powered Pumps **A**

Supplementing motor driven line, new air powered pumps are designed for controlled volume at constant speeds, proportional rates, and high pressures. Schematic diagrams feature 16-page Bulletin 450.—*Milton Roy Co., Chestnut Hill, Philadelphia 18.*

Hand Control Valves **B**

Having the flow characteristics of air-operated diaphragm control valves, hand control valves are described in 2-page Specification Sheet 403. Engineering drawing and mounting dimensions are included.—*Industrial Div., Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Materials Handling

Electric-Powered Truck **C**

Sit-down load carrier, tradenamed "Shuttle-Truk," is illustrated in 4-page Bulletin 190. Truck can go at 6½ mph. when fully loaded with 2,000 lb.—*The Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9.*

Flexible Metal Tubing **D**

Said to be highly wear- and heat-resistant, portable flexible metal tubing, called "Spiratube," is detailed in 6-page Catalog 54. It is designed to meet ducting requirements from 3 to 30 in. ID for air, other gases, and powdered, granular and other light solids.—*The Flexible Tubing Corp., Branford, Conn.*

Lever-Driven Lift Trucks **E**

Standard specifications of four models of lever-driven fork lift trucks highlight 4-page folder. Capacities range from 2,000 to 3,500 lb.—*Mobilift Corp., 835 S. E. Main St., Portland 14, Ore.*

Electric Hoists **F**

Lifting capacity from ½ to 2 tons is specified for electric hoists presented in 8-page Bulletin H-112. Data and cut-away photos of parts are included.—*Whiting Corp., Harvey, Ill.*

Hooks, Tongs, Grips and Slings **G**

Bulletin 200B, 24 pages, claims to have a grab for any lifting job. Covered are hooks, grips, tongs and slings, with complete specifications.—*Downs Crane & Hoist Co., 540 W. Vernon Ave., Los Angeles 37.*

Pick-Up Truck **H**

Specifications on new 2,000-lb. capacity pick-up truck, tradenamed "Totemaster," are contained in 4-page Bulletin 30. Truck has 21 sq. ft. of loading space, and travels up to 20 mph.—*Lewis-Shepard Products, Inc., 262 Walnut St., Watertown, Mass.*

Overhead Conveyors for Meat Packers **I**

Featured in 76-page Catalog 63 is a section containing plant layouts for slaughtering and dressing of hogs, calves, beef and sheep. Rest of catalog illustrates a complete line of overhead conveyors for the meat packing industry.—*The Allbright-Nell Co., 5323 S. Western Blvd., Chicago 9.*

Steel Belt Conveyors, Power Turns **J**

Stainless steel belt conveyors and 90 and 180 deg. power turns are depicted in 8-page booklet. Two pages of food industry applications are shown.—*Sermat Div., Peterson Products Corp. 1735 Armitage Ave., Chicago 22.*

Electric Tiering Trucks **K**

Three models of electric tiering trucks—

skid, single-faced and double-faced pallet—are explained in 4-page Bulletin 701. These will handle 48x48 in. loads at right angles from a 6-ft. aisle.—*Lyon-Raymond Corp., Greene, N. Y.*

Control Equipment

Control Connecting Linkage A

Engineering drawings and price data on control connecting linkage for use with control drives are set forth in 16-page Specification CA942. Some styles and sizes of this equipment have been standardized, so ordering is simplified.—*Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10.*

Recording Viscometers B

New recording viscometers, originally developed for textiles, but also offered for application in the food industry, are covered in Bulletin V-1000B, 8 pages. Design and working principles of equipment are presented.—*Norcross Corp., Newton 58, Mass.*

Paper Testing Instruments C

Many kinds of paper testing machines are described in 2-page Leaflet P-500.—*Thwing-Albert Instrument Co., Penn St. & Pulaski Ave., Philadelphia 44.*

Testing Sieves D

Sizes and prices of testing sieves with openings from .0015 to 4 in. are tabulated in 4-page folder. The "End-Shak" sieve shaker is also shown.—*Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J.*

Flow Meters and Tubes E

Thirteen different types of flow meters and tubes are depicted in 4-page Bulletin 100-E4B, including several venturi nozzles.—*Builders-Providence, Inc., Providence 1, R. I.*

Rents Electrical Instruments F

Information regarding rental of various electrical instruments—ammeter, voltmeter, wattmeter and transformer—is contained in new booklet.—*InstruRental Co., 411 Albee Bldg., Washington 5, D. C.*

Plant Supplies

Can Build Your Own Files G

Almost any kind of file cabinet installation can be assembled using interchangeable sections listed in 12-page brochure titled *Record-Stack*. Sample assemblies are pictured.—*Remington Rand Inc., 315 4 Ave., New York 10.*

Hard-Facing Alloy Electrodes H

Properties, welding procedure, applications and sizes of six new types of hard-facing alloy electrodes are given in 12-page booklet.—*Alloy Rods Co., York, Pa.*

Negative Elastic Member I

Engineering drawings are offered describing the "neg'ator"—an elastic member having either constant or negative force-deflection characteristics in 4-page folder. It is used as an extension spring, clamp, and on motors.—*Hunter Spring Co., Lansdale, Pa.*

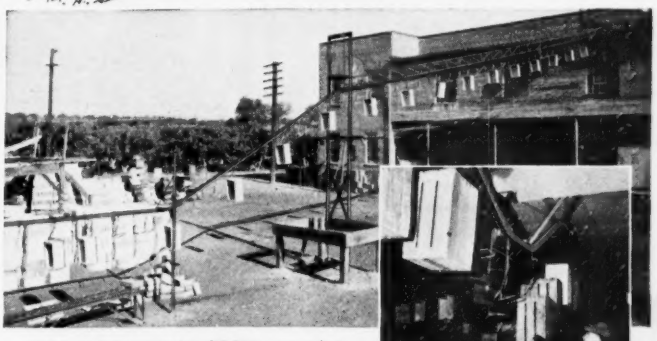
Cellular Rubber J

Different forms of cellular rubber, described as air-tight, moistureproof, and shock- and sound-proof, are illustrated in 12-page pamphlet.—*The Sponge Rubber Products Co., Shelton, Conn.*

Welding Fittings List K

Latest listing on stainless steel welding fittings are given in 8-page Price List 52W. Covered are elbows, return bends, stub ends

"ZIG-ZAG"—the conveyor as flexible as a KID'S CONSTRUCTION KIT



Fruit boxes being returned by ZIG-ZAG conveyor from packing plant to redistributing yard for return to orchards.

R-W

Zig-Zag Continuous Power Conveyors Raise Plant Productivity ... Lower Costs

Interior of fruit packing plant showing "dumper" hanging emptied boxes on ZIG-ZAG hooks for movement to yard.

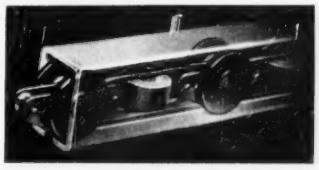
Indoors or out, there's practically no limitation to the purposes for which ZIG-ZAG Continuous Power Conveyors by Richards-Wilcox can be used. ZIG-ZAG, the conveyor that has revolutionized materials handling in industry, is adaptable to almost every plant condition or layout, and is the last word in flexibility.

100% Salvage with ZIG-ZAG

Yes, an R-W ZIG-ZAG Conveyor System, once you decide to use it for a different purpose than originally intended, in another part of your plant, can be taken down and put up again as easily as a kid makes changes with his construction kit. You can take it down here—put it up there—and in most cases use *all the parts!*

And ZIG-ZAG *quickly pays for itself.* So, find out at once how an R-W ZIG-ZAG Conveyor can raise productivity and lower costs in *your* plant. For a prompt engineering consultation, with no obligation, contact our nearest office today.

ZIG-ZAG—a steel, tube-like track through which travels a specially constructed, motor-driven chain—will carry unit loads up to 125 pounds per foot, at speeds ranging from 1 inch to 60 feet per minute. In and around, up and down—ZIG-ZAG keeps loads moving "as smoothly as water through a pipe."



Sanitary and safe—all moving parts fully enclosed.

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"A HANGER FOR ANY DOOR THAT SLIDES"

AURORA, ILLINOIS, U.S.A. *Branches in all principal cities*

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT
INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS
ELEVATOR DOOR OPERATING EQUIPMENT

Immaculate	Enhances any machine's appearance
Enamel Finish	An extra "talking point" for your product
Washable	Years ahead in styling
Rustproof	Increases plant pride—encourages cleanliness
½ to 15 h.p.	Costs little more than conventional motors

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Atlantic Plant: Milford, Connecticut
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Los Angeles 54, Calif., or Milford, Conn.
Send Sanitary Motor Bulletin

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Company_____
Address_____
City_____ Zone____ State_____

and tees.—*The Cooper Alloy Foundry Co., Hillside 5, N. J.*

Rubber Work Suits A

Made of rubber material, "Koroseal," new work suits are shown in 2-page Catalog Section 12005.—*B. F. Goodrich Co., Akron, Ohio.*

Adhesives B

Three recently added lines of adhesives are illustrated in new Bulletins 4, 15 and 16. First, of 2 pages, describes a label paste for both metallic and non-metallic surfaces. Second, of 2 pages, outlines a cooler-proof glue for labeling bottles subject to wet storage. And third, of 4 pages, discusses can labeling adhesives.—*Paisley Products Incorporated, 630 W. 51 St., New York 19.*

Strapping Unit C

Hand tool for binding, strapping or tying is described in 6-page leaflet, titled *Steelbinder.*—*A. J. Gerrard & Co., 1950 Hawthorne Ave., Melrose Park, Ill.*

Miscellaneous

Industrial Safety Equipment D

A comprehensive listing of all types of safety appliances and apparel for various kinds of industrial workers is contained in 190-page Catalog 6B. Pictures, descriptions and sizes are given.—*Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.*

Glassine Packaging Papers E

Twenty-one samples of glassine, greaseproof, waxed, coated and foil-laminated packaging papers are contained in 8-page folder. Selection chart is included.—*Riegel Paper Corp., 342 Madison Ave., New York 17.*

New House Organ F

Much Ado About Nothing is new house organ published in interest of better vacuum processing with better vacuum pumps.—*Beach-Russ Co., 50 Church St., New York 7.*

Industrial Equipment Replacement G

Machines and Productivity is reprint of talk on equipment replacement policy presented by George Terborgh, research director of Machinery & Allied Products Institute, before National Industrial Conference Board.—*Machinery & Allied Products Institute, 120 S. LaSalle St., Chicago 3.*

Care of Electric Equipment H

Series of articles written to promote intelligent maintenance of electrical machines is presented in 24-page booklet, *Care of AC Rotating Equipment.* Written by Fraser Jeffrey, assistant to company's chief engineer.—*Allis-Chalmers Mfg. Co., Milwaukee.*

Insulation Hardboard I

Design data on "Rubatex R-103-S" insulation hardboard is reported in 16-page Bulletin RBH-1-50. Technical aspects are covered.—*Great American Industries, Inc., Bedford, Va.*

Nickel Alloy Corrosion Tendencies J

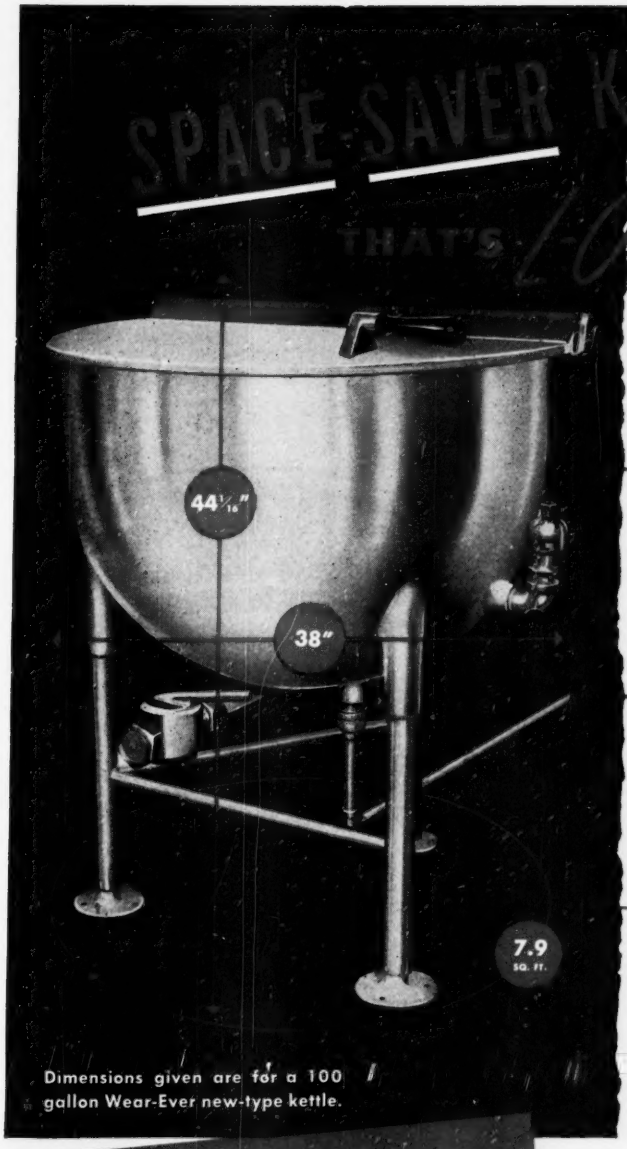
Resistance of nickel and its alloys to corrosion by caustic alkalis is treated in 24-page Bulletin T-6. Methods of testing, results and performances of alloys in many fields, including food, are covered.—*The International Nickel Co., Inc., 67 Wall St., New York 5.*

Corrugated Box Design K

Titled *Package Engineering,* this 24-page booklet presents a detailed study of technical aspects of corrugated box design and construction.—*The Hinde & Dauch Paper Co., Sandusky, Ohio.* —End

SPACE-SAVER KETTLE

THAT'S L-O-N-G ON HEAT



Dimensions given are for a 100 gallon Wear-Ever new-type kettle.

After a slimming diet in our engineering department Wear-Ever aluminum kettles have emerged with a new, space-saving silhouette.

Solution: Wear-Ever Aluminum conducts heat so well that the jacket doesn't have to be carried to the top of the kettle. This permits deeper construction without any sacrifice of cooking efficiency—*even at the very top.*

Proof: Wet your finger and carefully touch the top of a space-saver Wear-Ever kettle in use. It is H-O-T because aluminum quickly carries the heat *all the way up the sides.*

Made of extra hard alloy, too. Provides strength and durability that can give you thirty years or more of active service. For full details about Wear-Ever Aluminum Steam-Jacketed Kettles mail the coupon today to: The Aluminum Cooking Utensil Company, 307 Wear-Ever Building, New Kensington, Pa.

WEAR-EVER Aluminum

50TH ANNIVERSARY

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

1900 1950

The Aluminum Cooking Utensil Company
307 Wear-Ever Bldg., New Kensington, Pa.

Please give us full details about your space-saver steam-jacketed kettles that are long on heat.

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ADDRESS.....

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MAIL TODAY

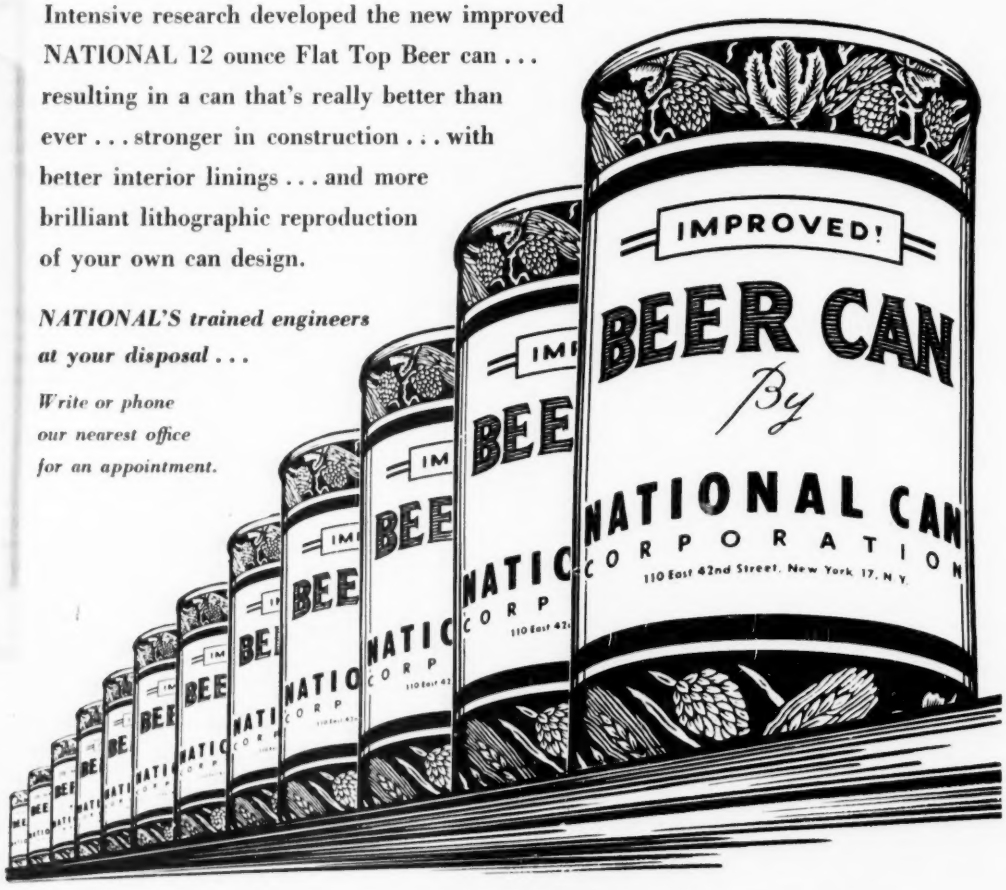
NATIONAL CANS
Rolling Again - - -
Better Than Ever

Yes — NATIONAL'S Beer cans are rolling again . . . better than ever . . . and more of 'em.

Intensive research developed the new improved NATIONAL 12 ounce Flat Top Beer can . . . resulting in a can that's really better than ever . . . stronger in construction . . . with better interior linings . . . and more brilliant lithographic reproduction of your own can design.

NATIONAL'S trained engineers at your disposal . . .

Write or phone our nearest office for an appointment.



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110 East 42nd Street, New York 17, N. Y.

Patents

Fresh Slightly Unripe Fruit Given Sweet Taste of Fully Ripened Fruit by Blending With Sweetening Medium Derived From Fruit Having Same Sugar Composition and Inert Non-Sugar Constitutents—*Arvid M. Erickson, San Jose, Calif., to Hawaiian Pineapple Co., Ltd., Honolulu, Hawaii.* No. 2,499,375. Mar. 7, 1950.

Mix Made by Blending Flour With Liquid Super-Cooled Shortening—*Ogden Johnson, Bronxville, N. Y., to Ford, Bacon & Davis, Inc., New York.* No. 2,499,586. Mar. 7, 1950.

Baking Pans and Like in Inverted Position Coated During Passage Along Conveyor and Over Spray Nozzle Supplied With Measured Amounts of Coating Material Under Air Pressure.—*Irving M. Archer, Dallas, to Campbell Taggert Research Corp., Kansas City, Mo.* No. 2,499,621. Mar. 7, 1950.

Edible Frozen Confections Formed in Multiple Cavity Mold Through Which Circulates Heat Exchange Fluid—*Leo D. Overland, Brooklyn, to Ice Cream Novelties, Inc., New York.* No. 2,500,006. Mar. 7, 1950.

Whole Citrus Fruits Individually Fed to Series of Extractor Units by Mechanical Means—*James M. Hait, San Jose, Calif., to Food Machinery & Chemical Corp.* No. 2,500,030. Mar. 7, 1950.

Mixture of Three Constituents of Different Specific Gravities Separated by Centrifugal—*George J. Strezynski, Chicago, to The De Laval Separator Co., New York.* No. 2,500,100. Mar. 7, 1950.

Albumen Separated From Whey, Made Free From Sugar, and Concentrated by Specially Designed Centrifugal—*George J. Strezynski, Chicago, to The De Laval Separator Co., New York.* No. 2,500,101. Mar. 7, 1950.

Reducing Agent for Use in Bottled Beer and Ale Made by Treating Hexose in Water Solution With Ammonia at 60 to 120 Deg. C. and Cooling to Impart Uniform Decolorizing Power—*Roland E. Gunther, Oceanside, and Mortiz Kohn, New York, and Donald C. Stone, East Orange, N. J., to Dehls & Stein, Inc.* No. 2,500,147. Mar. 14, 1950.

Pudding Composition Made to Consist of Gelatinized Starch Dried to Frangible Combination With Sugar, Chemical Gelatinizing Agent, Water and Flavoring Agent Dried and Comminuted to Fine Grain Size—*Henry C. Hinz, Jr., George R. Schermerhorn, Sr., and Frank L. Dorn, Rochester, N. Y., to American Home Foods, Inc., New York.* No. 2,500,179. Mar. 14, 1950.

Ice Cream Made to Have Lactose Content in Relation to Mineral Salts Content at Least 10 Percent Greater Than Ratio of Lactose to Mineral Salts in Skim Milk Solids—*Carl F. Koerver, Brooklyn, to the Borden Co., New York.* No. 2,500,315. Mar. 14, 1950.

Bread Loaves Automatically Dumped From Pans and Turned Into Upright Position—*Arthur K. Jordan, Tacoma, Wash.* No. 2,500,361. Mar. 14, 1950.

Eggs Processed During Continuous Passage Through Bath of Treating Liquid by Means of Baskets or Trays Suspended From Trolley Type Conveyor—*Seth S. Barker, Ottumwa, Iowa.* No. 2,500,396. Mar. 14, 1950.

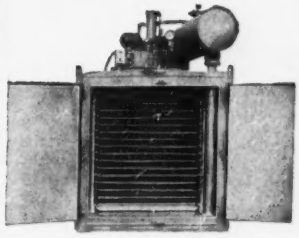
Fruit and Like Packed in Rectangular Box Protected by Ventilated Cushion Material—*Benjamin M. Hoblick, Fresno, Calif., to Blake, Moffit & Towne, San Francisco.* No. 2,500,412. Mar. 14, 1950.

Casein Converted Into Reaction Product by Incorporating Into Ethylene Glycol and Urea at About 125 Deg. C., Adding Slurry of Paraformaldehyde and Ethylene Glycol and Cooling Preparatory to Grinding With Acetone, Filtering, Washing With Acetone, and Drying—*James P. Danehy, Riverside, Ill., to Harris-Seybold Co., Cleveland.* No. 2,500,453. Mar. 14, 1950.

Green Lima Beans, Peas, and Like, Hulled in Unit Having Stationary Knives—*Fred A. Black, Wichita Falls, Tex., Lucy Black, Executrix of Fred A. Black, deceased; one-half to Lewis M. Black, Rockport, Tex.* No. 2,500,483. Mar. 14, 1950.

Antioxidant Made to Consist of Esters of Ascorbic or Gallic Acids Soluble in Propylene Glycol—*Lloyd A. Hall, to The Griffith Laboratories, Inc., Chicago.* No. 2,500,543. Mar. 14, 1950.

Orange Juice Preserved by Infusing With 8.2 Percent Carbon Dioxide, 0.1-0.2 Percent Acetylene, 0.2-0.1 Percent Oxygen, 3.8 Percent Carbon Monoxide, 2.2 Percent Methane, and 85.5 Percent Nitrogen Preparatory to Concentrating by Evaporation—*Mellville E. Dunkley, Modesto, Calif.* No. 2,500,670. Mar. 14, 1950.



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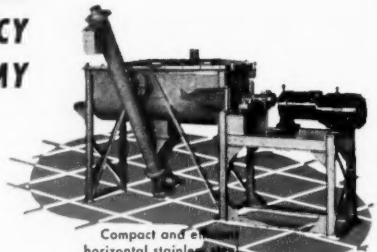

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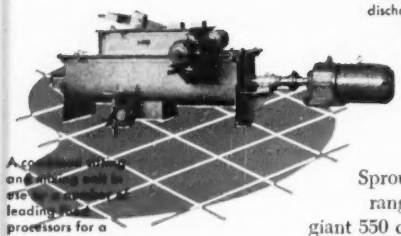

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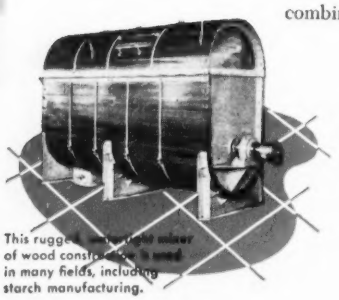

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Nuts Cracked and Shelled During Passage Through Unit Equipped With Horizontal Axis Rotor Carrying Cracking Elements on Periphery—*Alfred D. Goodwin, Manteca, Calif.* No. 2,500,675. Mar. 14, 1950.

Shells of Hard-Boiled Eggs Removed by Pressure of Flowing Fluid—*John B. Richards, Indianapolis.* No. 2,500,705. Mar. 14, 1950.

Grain Germinated Under Controlled Conditions During Malting—*Frederick C. Stewart, Glasgow, Scotland; one-half to Robert Boby, Ltd., Bury St. Edwards, England.* No. 2,500,775. Mar. 14, 1950.

Physiologically Active Pteroyldiglutamylglutamic Acid Produced by Grown Non-Pathogenic Corynebacterium on Fermentable Medium—*Brian L. Hutchings, Pearl River, N. Y., to American Cyanamid Co., New York.* No. 2,500,825. Mar. 14, 1950.

Glutamic Acid and Potassium Carbonate Reacted in Presence of Water to Supply 1 Atom of Potassium for Every Molecule of Acid to Make Monopotassium Glutamate—*Frank J. Cahn, Huntington Park, Calif., to Louis Milani Foods, Inc., Maywood, Calif.* No. 2,500,919. Mar. 21, 1950.

Buckwheat Extracted With Hot Water to Obtain Rutin Content Preliminary to Treatment of Extract with Adsorbent For Removal of Impurities and Crystallization of Rutin From Treated Solution—*James F. Couch, Glenside, and Charles F. Krewson and William L. Porter, Philadelphia, to United States of America.* No. 2,500,930. Mar. 21, 1950.

Ungelatinized Starch Treated With Ether—Forming Reagent in Presence of Alkaline Medium to Form Ether Linkages With 2 Hydroxyl Groups of Starch Molecules and to Give Starch Property of Inhibited Gelatinization When Dispersed in Water Under Normal Gelatinizing Conditions—*Moses Konigsberg, New York, to National Starch Products, Inc., New York.* No. 2,500,950. Mar. 21, 1950.

Fruit Pits Removed by Action of Rotary Drum Coaxially Operated in Relation to Perforated Cylinder—*Emile Eymeric, Tunis, Tunisia.* No. 2,500,981. Mar. 21, 1950.

Impure Sugar Solutions Refined by Adjusting pH to 6-6.8 and Mixing With Finely Divided Cotton Seeds to Form Precipitate—*John Godston, Staten Island, N. Y.* No. 2,501,272. Mar. 21, 1950.

Candies Mechanically Wound Into Helical or Screwlike Shapes.—*Nils Adolf Nilsson Gavle, Sweden.* No. 2,501,288. Mar. 21, 1950.

Beverage Bottles and Like Sealed With Plastic Closures Preheated and Applied Under Pressure—*Harold E. Rue, Wauwatosa, Wis., to Pabst Brewing Co.* No. 2,501,291. Mar. 21, 1950.

Constituents of Bottled Beverages Mixed by Rotation About Horizontal Axis While Positioned in Radial Plane—*Stanley A. Domack, John J. Rutkowski, and Donald L. Sissler, Oshkosh, Wis., to Keenline Equipment Corp., Oshkosh.* No. 2,501,441. Mar. 21, 1950.

Whole Milk Concentrated to Total Solids Content of 40-70 Percent by Weight, Adjusted in Ratio of Butterfat to Milk Solids-Not-Fat, Heated From 150-190 Deg. F., and Homogenized While Hot at Pressure From About 500-3500 Psi.—*Wesley H. Hoecker and Bernard W. Hammer, Orinda, Calif., to Golden State Co., Ltd., San Francisco.* No. 2,501,445. Mar. 21, 1950.

Bottles and Like Filled With Liquid Contain-

ing Gas Under Pressure in Machine Equipped With Filling Head Having Valve for Controlling Air Displacement—*Lucien Grosbois, Lyon, France, to Societe Nouvelle des Anciens Establissements Wenger, Paris, France.* No. 2,501,511. Mar. 21, 1950.

Fresh Raw Lobster in Shell Prepared for Cold Storage by Heating Exterior Sufficiently to Sear Surface of Meat Next to Shell, Loosening Meat From Shell, Cooling and Rapidly Freezing—*William M. Altenburg to GI's Inc. of Portland, Me.* No. 2,501,655. Mar. 28, 1950.

Eggs Peeled by Rotating Cutters—*Phillip Kelley, Haverhill, Mass.* No. 2,501,679. Mar. 28, 1950.

Vegetables Shredded by Manually Operated Rotatable Head—*Prescott S. Mover, Lakewood, Ohio.* No. 2,501,687. Mar. 28, 1950.

Pies Baked in Pan Fitted With Device to Catch and Retain Pie Juices and to Aid in Uniform Baking of Pie—*Arthur Vredenburg, Waukesha, Wis., to Leo A. Mullaney and Martha L. Cherry, Milwaukee.* No. 2,501,799. Mar. 28, 1950.

Food Shipped in Airplanes Constructed to Permit Passage of Controlled Volume of High Altitude Atmospheric Air Through Cargo Chambers to Refrigerate Cargo—*William B. Haggerty to Tampa Aviation, Inc., Tampa, Fla.* No. 2,501,898. Mar. 28, 1950.

Sucrose Crystallization Inhibitors Removed From Molasses and Similar Syrups by Treatment With Monoethylene Glycol Monoalkyl Ether—*John H. Payne to Pacific Chemical & Fertilizer Co., Honolulu, Hawaii.* No. 2,501,914. Mar. 28, 1950.

Glycinin Curd Obtained From Soya Protein Stock by Alkaline Extraction and Acid Precipitation Modified by Pepsin Under Controlled Temperature and Hydrogen Concentration Conditions—*Louis Sair, St. Louis, and Richard Rathman, Decatur, Ind., to Central Soya Co., Inc., Fort Wayne, Ind.* No. 2,502,029. Mar. 28, 1950.

Edible Fats, Oils, and Oleaginous Foodstuffs Protected Against Autoxidation by Incorporation of Not More Than 0.1 Percent Tetra Alkylthiuram Disulphide—*Frederik D. Tollenaar to Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek, Utrecht, Netherlands.* No. 2,502,109. Mar. 28, 1950.

Meat Salted and Dehydrated to 20-30 Percent Water Content in Presence of Edible Fatty Substance Under Vacuum at Temperatures Above Boiling Point of Water for Vacuum Used—*Siegried Zimmerman, Seekirchen, near Salzburg, Aus.* No. 2,502,115. Mar. 28, 1950.

Soft Protein Curd Dried During Passage Through Tunnel on Perforated Belt by Air Flowing Vertically and Generally Countercurrently to Direction of Conveyor Movement; Air Subsequently Reheated and Passed Downwardly Through Curd to Form Crust and to Draw Curd Into Close Contact With Belt—*Ewald Erickson, Watertown, Minn., to Hercules Powder Co., Wilmington, Del.* No. 2,502,134. Mar. 28, 1950.

Doughs Baked in Oven Equipped With Continuous Conveyor and Means for Injecting Mixture of Air and Water Vapor at Atmospheric Pressure and With Dew Point Temperature Higher Than That of Dough Entering Oven at Dry Bulb Temperature Below 212 Deg. F.—*Edward H. Paulsen, Sea Girt, N. J., to Edward H. Paulsen, White Plains, N. Y.* No. 2,502,172. Mar. 28, 1950.—*End*

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Smokehouse Unit

—*Continued from page* 51

drilled in the pipe at the U's bottom to permit drainage of the creosote. This change has so improved combustion that little creosote has formed. In fact, only small drops have ever got as far as the air intake atop the smokehouse. And no creosote has yet reached the fan. As a precaution, pipes will be cleaned occasionally, but the fan is not expected to need cleaning for a least three or four years.

Since a creosote fire produces fumes that would ruin everything in the smokehouse, an automatic fire extinguishing system has been installed. Should the temperature in the smoke pipe reach 160 deg. F., a fusible link will melt and close a damper, which smothers the smoke generator. Should this be inadequate and the temperature reaches 180 deg., CO_2 will be automatically introduced and the fan will be shut off.

Construction Details

The smokehouse is of concrete, with walls, floor and ceiling 6 in. thick. Rock wool and sheet rock insulation is covered with concrete plaster. Each unit has separate controls, allowing simultaneous kippering and hard smoking in adjacent units.

Smoke controls are operated manually from a control board outside the smokehouse, with a separate control for each pipe in each unit. Other controls on this board regulate the air intake, exhaust, and volume control dampers by means of air motors attached to each damper. The amount of air pressure varies from 1 to 15 lb., according to the damper opening. For example, when the dials register 7 lb., the dampers are half open. Separate push-buttons on the control board start and stop the fan for each unit.

Wet- and dry-bulb temperatures are recorded electronically on the control board through pickups at the point where the circulated air leaves the smokehouse. The dry-bulb instrument gives the Fahrenheit recording, and the wet-bulb instrument indicates the humidity. Relative humidity is, of course, determined by the difference between the two readings. A drip valve introduces sufficient water to keep the wet-bulb reading 30 deg. below that of the dry-bulb.

The smokehouse operator checks the temperature charts every 15 min. since the relative humidity is very important. Should the difference be too great, it would mean that too much moisture was being dried out of the fish. Should the difference be too little, it would mean a loss in heat efficiency.

Basic design for the smokehouse came from Robert K. Pedersen, research engineer for the Washington State Department of Fisheries. Clarence L. Anderson, former director of the department and now director of fisheries for Alaska, began working on the problem in 1943. The department constructed an experimental smokehouse in 1946. Several commercial smokehouses have been built on its pattern, but none so large nor with such a fine degree of control as this San Juan unit.

—*End*—

Crystallized Fruit

—*Continued from page* 84

product later in the process. Flavor losses are no greater in preparation of spreads than in jams and jellies made by ordinary processes. However, the return of volatile flavors to the spread produces a superior product. And because of the relatively low temperatures involved in the process, there is little loss of added essence.

The fruit component may be juice, puree or concentrate. Juice and puree should be de-pectinized to form a concentrated product that is easier to handle. If a concentrate is used, it should not be of the "full flavor" type[4], because vacuum treatment removes the volatile flavor component. And the fruit component should be suitably processed to destroy enzymes.

The sugar component must be either natural good-flavored honey or, preferably, de-flavored honey (refined honey syrup)[5].

Starter material for sugar crystallization may be taken from a previous batch. Alternately, it may consist of the sugar component alone, which has previously been seeded with dextrose hydrate and crystallized. It may also be finely ground crystalline dextrose hydrate.

The process itself is relatively simple. Equal weights of the sugar and fruit (if a fruit concentrate, use an amount equivalent to an equal weight of single-strength juice) are mixed and vacuum-cooked below 150 deg. F., to an 82 to 85-percent solids content, then the vacuum is released and the concentrated product is cooled to 90-100 deg. F. The concentrate is next blended with 5 to 10 percent finely crystallized starter in a tank equipped with a slow-speed mixer. At this point, fruit essence, [4,5,6] if available, should be added.

The well-mixed product is then filled into consumer packages. And after labeling and casing, it is held at 55 to 60 deg. F. for about seven days to complete crystallization.

If essence is added, the product should be quickly placed in the cool room after casing, to minimize loss of volatile aroma constituents.

Determination of solids content of the concentrated material should be by refractometer. Since sugars present are largely levulose and invert sugar, conversion tables for sucrose give erroneous results. Suitably accurate values result from the refractive index-honey solids of Chataway, as adopted by the AOAC[7]. Degrees Brix, as determined by the refractometer, may be converted to percent solids in the spread by using the figures given in the table accompanying this article.

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1. E. J. Dyce, U. S. Patent 1,987,893, Jan. 15, 1935.
2. J. W. White, Jr., and G. P. Walton, AIC-272, BAIC, 1950.
3. E. M. Widdowson and R. A. McCance, *Biochem. J.*, 29, 151, 1935.
4. R. P. Homiller, et al., "Preparation of Full-Flavor Concentrated Concord Grape Juice," In press.
5. H. P. Milleville and R. K Eskew, AIC-63, Sup. 1, BAIC, 1945.
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7. Anon., *J. AOAC*, 25, 99, 1942
8. *Methods of Analyses, AOAC*, 5th Ed., 1940, Appendix, Table 6.

The above article is taken from the report of a study made by the Eastern Regional Research Laboratory under the Research & Marketing Act of 1946.

—*End*—

New Mixing Method

—*Continued from page* 49

ening agent used may be reduced or the quantity of water used may be increased.

Examination of the cakes shows that those made by the sugar-water formulas Nos. 1 and 2 have better crust colors, more tender crust, less indications of undissolved sugar in the crusts, and better volume than those made by the control formula. Also, cakes made by the two experimental formulas are more easily removed from the pans. Those made according to sugar-water formula No. 1, have a finer grain and better texture than those by the control formula. Cakes made by the sugar-water formula No. 2, in which the baking powder was not reduced and the water content was increased, have a slightly coarser grain and are more fragile than are the control-formula cakes. In no other respect are any indications of over-aeration observed.

This new method of making cakes should be of particular interest to bakers who do not have facilities to

handle liquid sugar. The method does not overcome the disadvantage of weighing the sugar, but it does give the advantage of improved quality of cakes made with liquid sugar.

The bigger cake bakeries have been making increased use of liquid sugar and are enjoying a competitive advantage over those not equipped to use liquid sugar. Use of the new mixing method using granulated sucrose eliminates that advantage as far as the quality of the cake is concerned and without the necessity of acquiring new equipment or additional machinery.

The Institute also has available new-method formulas for lean and regular sponge jelly roll and 120 and 130 percent sugar pound cakes. Both feature the 30 sec. pre-mix at 2nd speed. But the jelly roll ingredients are incorporated in a 5-min. wire whip at 3rd speed, while the pound cake batter is paddle-mixed for 8 min. at 2nd speed.

—End—

Mid-Year Outlook

—Continued from page 43

moderately below 1949. But bad weather threatens to reduce some crops considerably. This will limit the total size of the pack, even though demand has turned strong for most items.

For the first time in several years distributors are beginning to rebuild inventories of many canned foods. If crops are short, prices seem sure to rise.

Grain products: The corn and wheat harvests will be smaller than in recent years. But unless there is a short corn crop, supplies will be ample for milling, and prices will continue low, probably around the government support levels. Lower export demand for wheat and flour will restrict activity in this field. Production of bread and cake should not vary greatly.

Meat packing: Fall slaughter of hogs and cattle is forecast higher than in 1949. The spring pig crop will be about 6 percent higher than last year, and there are reportedly 8 percent more cattle on feed in the corn belt. Lamb supplies, however, will be smaller. And the total increase in meat output may be no more than enough to take care of the increase in demand. High industrial employment promises to strengthen both demand and prices.

Meat by-products: Output of lard, grease, and tallow will increase with slaughterings. But demand may not hold up as well because of lower exports and more competition from butter, vegetable oils and, in soap making, from synthetic detergents.

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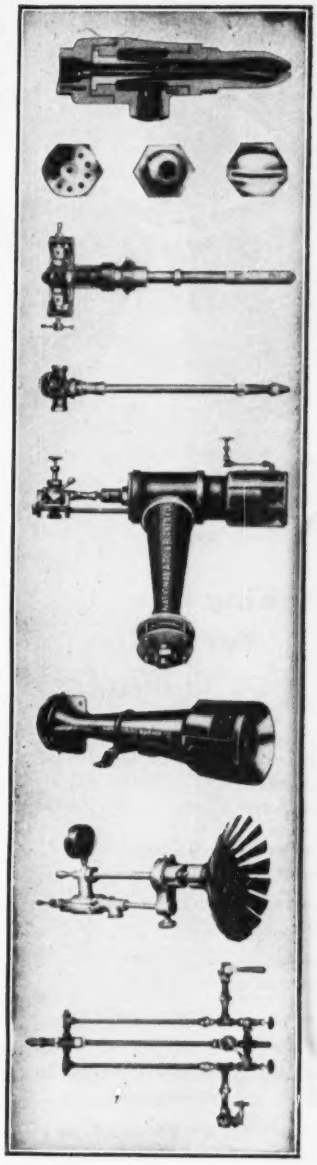

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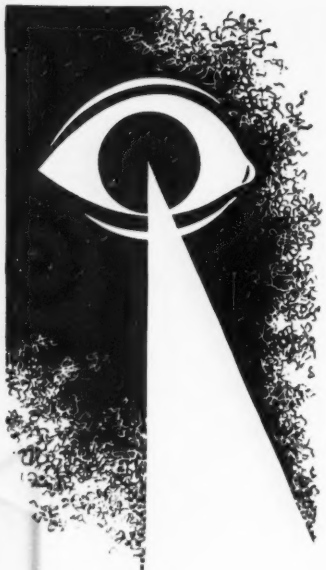

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vegetable oils will be slightly smaller this season, with an increase in soybean oil more than offset by less cottonseed oil and peanut oil. What happens to prices here depends largely on the trend of export demand. In any event, lower prices seem likely, considering the expected increase in output of butter and animal fat.

Production of margarine seems sure to rise with removal of tax and other federal restrictions July 1. However, output of shortening—the most important vegetable oil product—will probably decline as lard production increases. During the first half of this year, large amounts of shortening are believed to have gone to inventories.

Dairy products: Fluid milk output has been running 4 percent above 1949 and seems likely to maintain some gain throughout the year. Sales of milk to consumers will be only slightly larger. So most of the increase in milk flow will be reflected in higher output of manufactured dairy products—butter, cheese, nonfat dry milk solids, and evaporated milk. Consumption of these products evidently cannot be increased at present prices. So the additional output will largely be taken by government purchases.

"Moving Those Dries"

—Continued from page 79

They are a help, but internal pressure can lift them and carry considerable material into the vents.

A 3-in. duct to the dust removal unit will maintain negative pressure in dust forming equipment, thus ending the loss of material through the vents.

Though this may be an improvement, it does not prevent loss of material, which accumulates in the dust removal units instead of escaping out the vents. The loss may be as much as 2 percent of the product. Air locks may be employed to prevent large quantities of air from entering the conveyors following the mills, but there will be leakage.

No matter where the product escapes, it is a nuisance. If it escapes into the processing room, it must be removed from all horizontal surfaces by plant labor, and discarded. If it issues to the outside air, it is still a loss, and it covers the roof of the plant, plugging downspouts. It is relatively simple to prevent all loss of material caused by dusting and at the same time minimize the danger from dust explosions.

Considerable internal dust is created in bucket elevators. This dust will issue from the infeed, unless a tube type conveyor is used. Trough conveyors have sufficient clearance so that dust will feed back through the open space above the screw. Explosion venting is not necessary for either type conveyor. Caution is necessary, however, in the design and operation of bucket elevators when there is an explosion hazard from such products as sugar, starch and cocoa, which will ignite when suspended in the proper volume of air.

Because of the amount of dust in a bucket elevator, it should be vented to the atmosphere. This is done by continuing the elevator housing up through the roof. The vent is covered at the top by a light metal roof, of sufficient slope so that snow will not stick to it. Small gage wires hold this roof in place so that it will blow off with slight internal pressure but be secure against a high wind.

The metal roof is bent to a peak, with sides sloping at 60 deg. The area of either side is then the same as that of the elevator cross-section, which should be 1 sq. ft. for every 30 cu. ft. of elevator volume. Side vents of equal area may be used when venting through the roof of the plant is not feasible. Such vents must not turn more than 22 deg. in any direction once they leave the elevator surface.

Product loss is prevented by either of two methods. Here is one way: When the explosion venting is through the roof, an inverted wire basket or frame of the same cross-section as the elevator housing is attached to the top of the vent on the roof. The area of the basket or frame should be 10 sq. ft. or more. A canvas bag is pulled over the frame and tied at the bottom with a draw string or clamped to the frame.

An outer shell, at least 2-in. larger than the dimensions of the vent, surrounds the bag. A blow-off roof over the top protects the bag from the weather. Dust laden air rises in the vent and passes through the canvas bag. Material collects on the inside of the bag and falls back into the elevator.

The other method is to make a metal frame of strap iron with the same area as the vent top basket. A canvas bag is slipped over this frame, which is placed in the area between the belts of the bucket elevator directly below the upper pulley. The bag is vented to the atmosphere by a 3-in. duct through the side of the elevator. An access door on the side of the elevator opposite the duct permits removal of the bag for cleaning.

Whether the bag arrangement is on the roof or inside the elevator, the bags should be removed and laundered regularly, to prevent an accumulation of bacteria and molds.

Neither of these two devices will

interfere with the discharge of pressure in the event of an explosion. They make it much easier to keep the plant clean and prevent material loss.

—End—

Tip On Good Buy

—Continued from page 38

shutting off the air to the large tank when the desired pressure has been reached. The scale dial, temperature dial, and scale lights show the operator the progress of these operations.

When the time cycle on a mixer requires these ingredients, the indicator light glows and the operator pushes the corresponding mixer button. This opens the tank discharge valve and starts a timer to shut off mixer on the liquid discharge system. The air pressure in the tank then delivers these liquids.

The reduced pressure in the tank actuates the second pressure switch, which opens the water discharge valve and starts a timer to shut off the air to the water tank. The hot water, under pressure in the smaller scale tank, is discharged through the larger scale tank and through the liquid discharge system, washing out both the tank and the pipe line on its way to the selected mixer.

Discharge of the liquids and water is indicated on the scale dial. And when the scales "empty" light glows, the valves all return to the starting position. The light also tells the operator that the system is again ready.

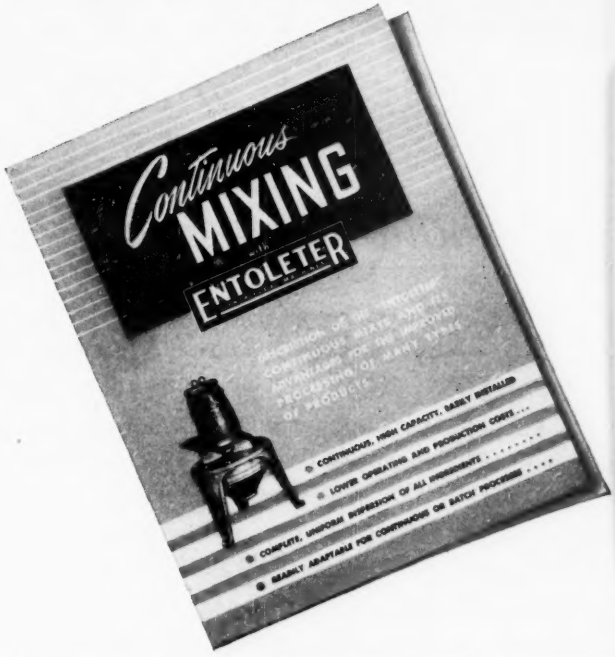
As a duplicate control, when only small quantities of ingredients are fed to the scale tank, the discharge of the liquids in the large tank uncovers an electric probe rod which takes over the functions of the second pressure switch.

The operator has directed this entire operation by pushing two buttons. The simple dial and light indications show him the progress of every step. He can stop any operation by pushing the stop button, and he can resume by pushing the start button.

In a recent typical case, all the process operations were combined in three major control boards so that three operators—instead of eight—directed the entire production. The controls and interlocks and the actuating devices cost $40,000. Five men were saved by an investment of $8,000 each Figuring these men at $1.25 per hr. or, as stated previously, at an annual figure of $3,600 per man, the savings just in labor for the five men amount to $18,000 per year. And again, these savings alone will pay off the investment—the three boards—in less than three years.

Improve Food Processing with CONTINUOUS MIXING...

This Bulletin Brings the Facts on New, High Speed Mixer



- **Lower Operating Cost . . .**
- **Complete Uniform Dispersion of Ingredients . . .**
- **Continuous or Batch Process . . .**

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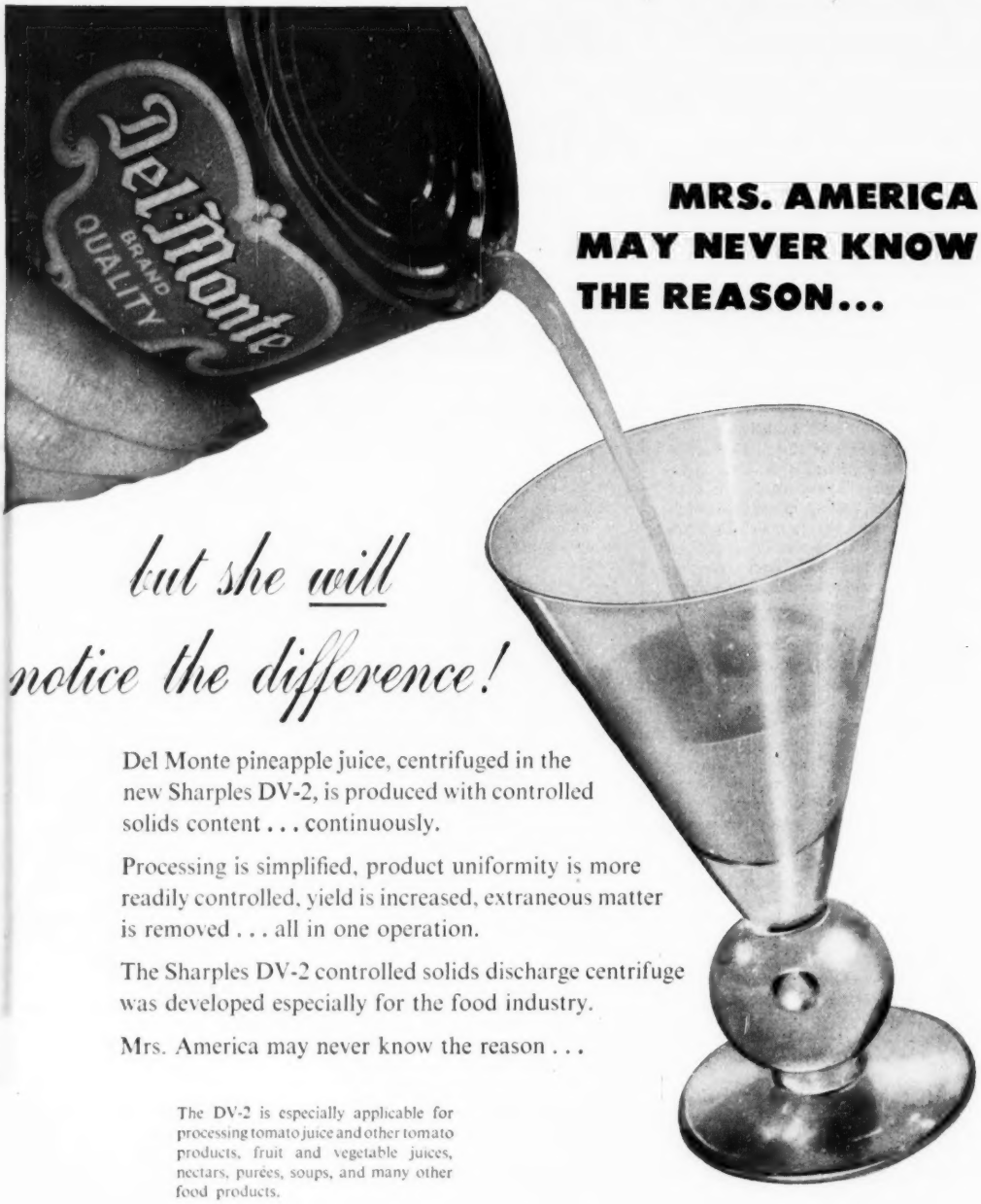

MRS. AMERICA MAY NEVER KNOW THE REASON...

but she will notice the difference!

Del Monte pineapple juice, centrifuged in the new Sharples DV-2, is produced with controlled solids content . . . continuously.

Processing is simplified, product uniformity is more readily controlled, yield is increased, extraneous matter is removed . . . all in one operation.

The Sharples DV-2 controlled solids discharge centrifuge was developed especially for the food industry.

Mrs. America may never know the reason . . .

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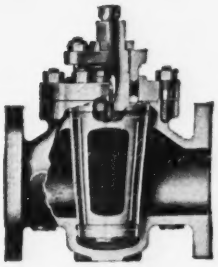
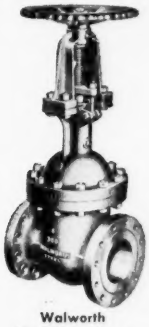
● PIPE FITTINGS

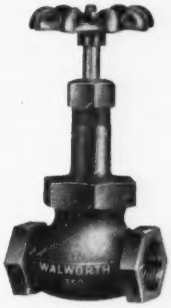


Walworth
Lubricated Plug Valve



Walworth
Steel Gate Valve

Walworth
Iron Body Gate Valve



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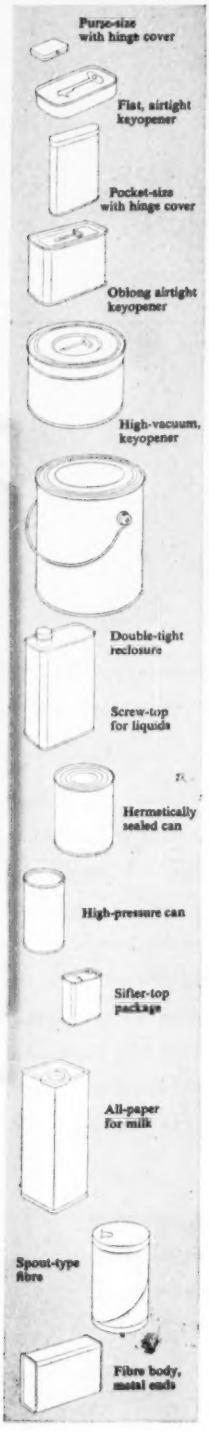

No fumbling, no fuss! Canco's famous "magic corner" opening feature is available not only with this pocket-size tablet box, but in larger size packages—a convenience your customers will welcome!

LOOK . . . one hand!

You know it best as a pocket, purse or bed-table container for tablets—the tiny tin that flips open and snaps shut at the press of thumb and finger!

What you may not know is that this same "magic corner" closure, so popular with millions of Americans, is available in an exciting variety of larger size metal boxes, each offering your product a new consumer appeal!

The "flat-fifty" cigarette box, for instance. Consider it as a possibility for crayons; for tissues; water color paints; lolly-pops—even panatela cigars. Flat as your wallet, it fits snugly into purse, pocket, brief case or the glove compartment of your car.

Many sizes . . . a legion of uses

Other Canco metal boxes with the "magic corner" closure are deeper, wider, longer, smaller. In fact, almost any rectangular shape or size can be custom-made if we do not have the exact size you require.

Each box opens to display entire contents; closes tight to prevent spilling. Each can be lithographed for big display of your brand name and message. All can be filled automatically and fast.

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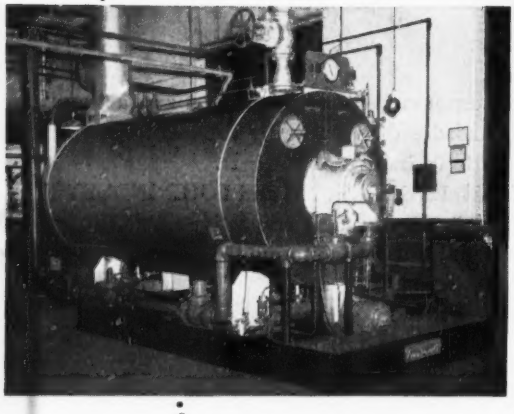

writes *E. Milota*, general manager of *Buckeye Garment Rental Company, Cleveland, Ohio*, about new 200 HP unit installed in their industrial laundry. "Its automatic operation assures ample steam regardless of load variation!"

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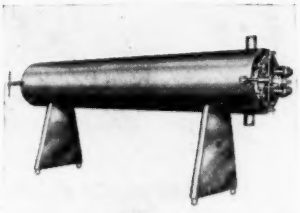
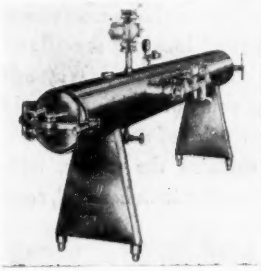
CUTS DOWN CLEAN UP TIME
Single end heads, **each with only one easily removable gasket,** are quickly opened for an easy cleaning job.

3 TYPES:

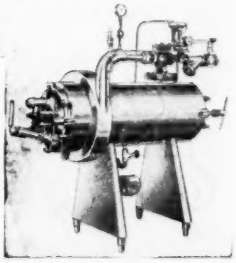
TYPE C Mojonnier ▶ Internal Tube Cooler using water or glycol. Coolant flows counter-current to product, insuring high heat transfer rates. Cools coffee, liquor, molasses and similar flowing liquids.





◀ TYPE R Mojonnier Internal Tube Cooler using either ammonia or freon. Refrigerant controls built in. For cooling such products as coffee liquor, beer, milk, buttermilk, citrus juices.

Mojonnier Tubular Heater ▶ with steam as heating medium. Widely used in heating milk products, fruit juices, pumpkin pulp, etc. A unique internal steam distributing assembly and desuperheating steam inlet and sump practically eliminate burn-on.



All product contact surfaces are polished stainless steel. Shell is insulated and covered with all-welded sanitary jacket. 21 models with capacities up to 7,000 gals. of product per hour.

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FRONT PAGE STORY

THE WALL STREET JOURNAL

May 8, 1950

Chickens Made Tastier By Packer's Injection Of Flavor-Enhancer

• • •

Miami Poultryman Does Trick With MSG; It May Also Be Tried on Steaks, Chops

BY JOHN A. MCWETHY
Staff Correspondent of THE WALL STREET JOURNAL

CHICAGO—A Florida poultry processor has come up with a new idea for making chickens tastier. He injects a seasoning agent into the dressed birds before marketing them.

Ac'cent!

Eugene D. Ellis of Miami has discovered that an injection of MSG, the centuries-old Chinese flavor-enhancer called monosodium glutamate, will make even a cold storage bird taste better than one cooked fresh from the barnyard.

And apparently chicken fanciers like what he's doing. Before he began using the new process, Mr Ellis' firm, Red Crest Poultry, Inc., sold about 20,000 pounds of chicken a week; now it's selling more than 60,000 pounds a week.

Note this! 300% increase!

Proof Is in the Eating

"To sell Miami grocers on my product," Mr Ellis recounted here the other day, "I bought a portable electric frying unit. I'd persuade the grocer to give me a piece of his choicest chicken. Then I'd fry that along with a sample of mine. I've yet to have anyone dispute that my chicken was the better."

By itself, MSG tastes merely slightly salty but when combined with other foods the saltiness disappears and the natural flavor of the meat, soup or vegetables with which it is used is accentuated.

He "stitches-in" Ac'cent

Taking a leaf from the meat packers, who pump pickling solution into hams through a hollow needle, Mr. Ellis injects an MSG solution containing gelatin into a chicken at six or seven places. Within five minutes, he says, it has spread uniformly through the bird.

Chemical Firm Buys Process

The producers of Ac'cent

The International Minerals & Chemical Corp., the largest producer of MSG, is so impressed with the results that it has hired Mr. Ellis to show other poultry plants around the country how to use the process. They will be permitted to use it without charge.

"We think accenting the flavor of chicken with MSG is the most significant new development ever offered to the $2,225 million poultry industry," says J. R. T. Bishop, International Mineral's vice president. "If it goes over as well elsewhere as it has in Florida, the new process might easily increase chicken consumption 5% to 10%."

Low cost!

International figures one penny's worth of MSG is sufficient to treat a three pound bird, according to Dr. B. F. Buchanan, technical service director One pound, which sells in quantity for $1.56, is enough for 600 pounds of poultry The machines for injecting MSG into the birds cost about $75—they're the same as the packers use on ham except for a slightly different injection needle. One man can inject MSG into about 2,500 chickens a day, Dr. Buchanan figures.

Simple, quick method!

And here's what the *grocers* did with these extraordinary chickens prepared with Ac'cent

One meat dept. buyer said: "We've never had a complaint on these chickens. We handle them exclusively, and once sold 19,000 pounds in only three days."

The president of a supermarket said: "Our customers like these chickens. We're willing to pay a little more for them. We sell 15,000 to 20,000 a week."

Another meat dept. manager said: "People comment on the appearance of these chickens and their superior flavor. They tell us our birds are the best in town."

HOTELS PRAISE THEM TOO

The meat buyer of a hotel supply company said: "We've never used chickens as fine as these. The hotels we serve are very happy with them." Another said: "Our hotel customers ask specifically for these chickens. They're exceptional."

GET THE FACTS BEHIND THIS STORY!

Let us tell you, at no obligation whatever, about this new method of "stitching-in" Ac'cent for better-tasting, better-looking, better-selling chickens. You'll find it interesting . . . *very* interesting.

Amino Products Division
International Minerals & Chemical Corp.
20 North Wacker Drive, Chicago 6, Ill.

are businessmen

COLD-BLOODED?

OF COURSE NOT! Literally, their normal body temperature is 98.6—same as laborers, engineers or any other group of people. And, figuratively, they're no more, or no less, cold-blooded—as a group.

We all know unreasonable generalizations can be dangerously false. Common sense and on-the-job experience show us the value of dealing specifically with ideas, problems—and *people*.

Let's not make the big—and costly—mistake, then, of generalizing on religious or racial groups. Adopt and *carry out* these common sense principles:

1. Accept—or reject—people on *their individual worth.*
2. Don't listen to or spread rumors against a race or a religion.
3. Speak up, wherever we are, *against* prejudice. Work for understanding.

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What is the identity test?
Where does the new method apply?
How does the new assay method affect vitamin A buying?

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For all your refrigeration problems consult Howe, since 1912 manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment. Write for descriptive literature.

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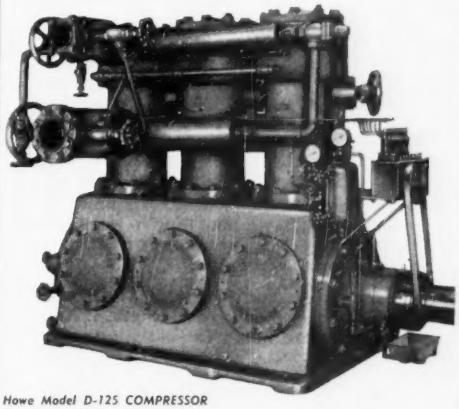
Your inquiry invited.



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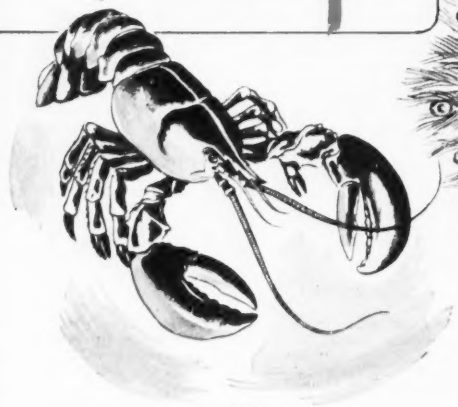
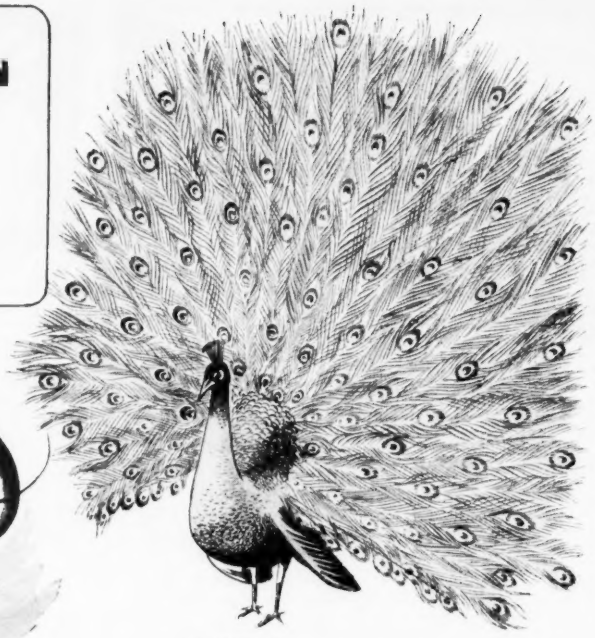


* LOBSTER



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*A hardshell denizen of coastal waters, having five pairs of legs, with the first developed into claws, or pincers. Very succulent when unwrapped.

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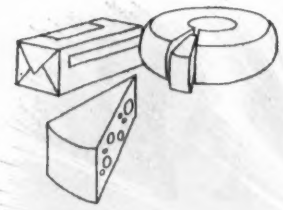

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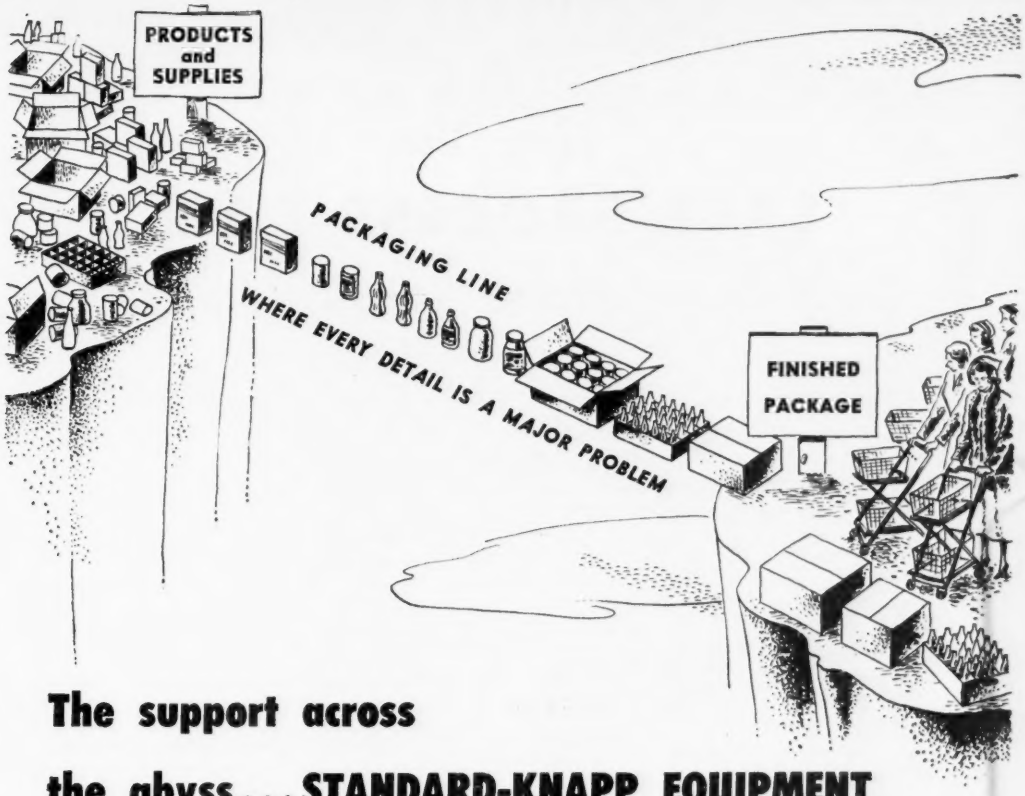


The support across the abyss... STANDARD-KNAPP EQUIPMENT

Keep your packaging line modern and equal in tempo along its length . . . eliminate the headaches and omissions of complicated maintenance . . . and you add dollars to your profits.

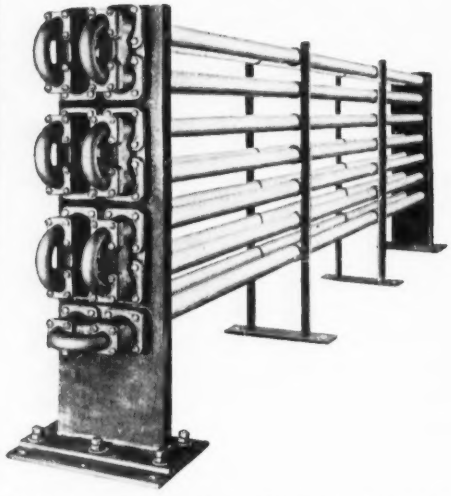
Prevent the bald-spotted profit margins that result from overlooking such details. Forestall the price rises that unhinge your salesmen's knees and take the snap out of your distributors' merchandising. The formula is Standard-Knapp Packaging Machines.

Engineered and built by men who have made the details of the packaging line a lifetime career, our machines step up efficiency, reduce overhead, simplify production and maintenance and beat down break-even points.

Claims? Not a bit of it, as Standard-Knapp installations in hundreds of leading plants attest. Keep your production line constantly at peak efficiency in every detail. Install Standard-Knapp Packaging Machines — they're *Automatically Preferred.*

STANDARD-KNAPP DIVISION OF HARTFORD-EMPIRE COMPANY PORTLAND, CONNECTICUT

How You
SAVE PROCESS TIME
with Carpenter Stainless Tubing



Tube-in-tube heater designed for rapid processing with 1½" O.D. tubing inside of 3¼" O.D. tubing—all Type 316 Carpenter Stainless Tubing. Unit can function as either a heater or cooler and features outstanding flexibility.

Faster heating and cooling can be obtained when you work with the uniform walls of this tubing. There are no heavy sections or "thin spots" in the tube walls. Heat transfer is uniformly good in every length of Carpenter Stainless Tubing.

In addition to providing the corrosion resistance you need for long equipment life, Carpenter Stainless Tubing can often be used in lighter gauges at no sacrifice of strength. The wall uniformity of this tubing saves you money. It eliminates the need for ordering heavier gauges than you actually need.

Call your Carpenter Stainless Tubing Distributor for your next order. Large stocks are maintained to meet your needs for rush delivery.

THE CARPENTER STEEL COMPANY
Alloy Tube Division • 111 Springfield Road, Union, N. J.

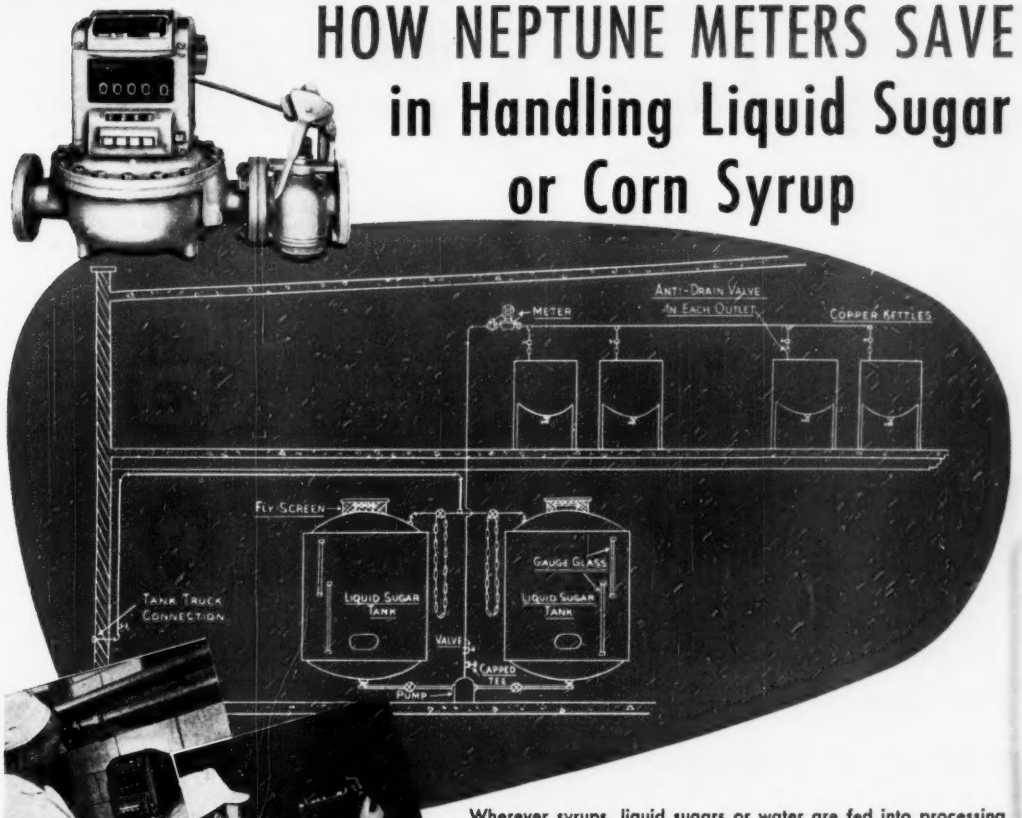
USEFUL SLIDE CHART OF TUBING DATA

For your copy of the Carpenter Stainless Tubing Slide Chart, send us a note on your company letterhead. The Slide Chart contains easy-to-use data on Physical Properties, Velocity Constants, Mass Velocity Constants, Areas of Tubes, etc. Write today.

24-Hour Service—You get *definite* delivery information within 24 hours when you call your Carpenter Stainless Tubing Distributor.

Carpenter
STAINLESS TUBING
"MORE THAN CORROSION RESISTANCE"

HOW NEPTUNE METERS SAVE in Handling Liquid Sugar or Corn Syrup



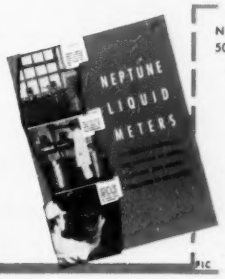
Wherever syrups, liquid sugars or water are fed into processing kettles, these new Neptune Auto-Stop meters give closer formula control, save ingredients—and save time too! Here's how: Simply push buttons to set the quantity you want to deliver, and open the valve. That's all—the Auto-Stop cuts off the flow at exactly the right quantity. Every batch perfect—you eliminate spoilage and spillage—save time and labor formerly spent watching gauge sticks, filling batch tanks or handling bags or buckets. These attractive, cream-colored meters are more sanitary, too—the liquids stay inside the pipes. Their easy-to-read registers include a totalizer to give you accurate, quick, cost-accounting figures. Other Neptune meters available for easy or tough jobs with 100 different liquids. Famous for sustained accuracy and low maintenance. For quick recommendations, just phone the nearest Neptune office below, or use the handy coupon.

NEPTUNE *liquid* METERS

50 WEST 50th STREET, NEW YORK 20, N. Y.

Branch Offices

ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER
LOS ANGELES • LOUISVILLE • No. KANSAS CITY, MO.
PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO
CANADIAN FACTORY: LONG BRANCH, ONTARIO



NEPTUNE METER COMPANY
50 W. 50th St., N. Y. C. 20.

☐ *Rush Bulletin 573-4*

We're interested in metering:

☐ *Liquid Sugar and Syrups*

☐ *Water*

Name.....

Company.....

Address.....

Koronet HAIR GUARDS

NOW...

SERVING OVER **50%** OF THE NATION'S FOOD INDUSTRIES!

SAVING OVER **70%** OF YOUR WOMEN WORKERS' HEADWEAR COSTS!

KORONET HAIR GUARDS ARE NATIONALLY FAVORED *Because*

- ✓ They are sanitary. Hair always completely covered—simply, smartly. Permit natural air circulation.
- ✓ They are economical. Cost only a few pennies more than an ordinary hairnet. Neatly webbed, of strong durable texture, designed for long service. No laundering, starching or ironing bills.
- ✓ They provide utmost protection. No loose or falling hair. Comply with all provisions of the Pure Food Act. Highly recommended by government food inspectors.
- ✓ They are comfortable. Cool, light, snug fitting, adjustable to any headsize.
- ✓ They are attractive. Flattering with all modern hair styles. Lend pleasing air of uniformity to both plant and employee appearance.

● Wherever introduced, Koronet Hair Guards have been enthusiastically approved by both management and employees alike. They are now a prime requisite in major food processing plants here and abroad. By providing your women workers with this economical, sanitary and attractive product you are performing an essential service for your plant and your employees.

ADVERTISING VALUE!

The KORONET Hair Guard is an exclusive patented product. Any name, trademark or slogan you desire can be imprinted on the shield in your choice of one or more colors. This is an ideal and inexpensive way to advertise your products.

Free Samples! *Take advantage of this offer. Prove to yourself that Koronet Hair Guards are a must for your plant. Write today for FREE SAMPLE, literature and prices!*

REGAL MFG. CO. 3203-05 ELSTON AVE. CHICAGO 18, ILLINOIS

WISSCO BELTS

...FOR PERFORMANCE UNDER PUNISHMENT

Where processing applications call for stand-up performance under punishment —there's nothing to equal long-wearing Wissco Metal Processing Belts.

Wissco Belts are specially engineered for high resistance to abrasion, corrosion and temperature extremes. Their patented mesh construction permits free circulation of air for more uniform heat treatment; provides free drainage for washing, quenching or de-greasing.

Write for booklet describing the adaptability of Wissco Belts.

WISSCO METAL CONVEYOR BELTS

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

CF&I

Sales Office and Plant — 56 Sterling Street, Clinton, Massachusetts
General Office — 500 Fifth Avenue, New York 18, N. Y.
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Pacific Coast — The California Wire Cloth Corporation, Oakland 6, California

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"JOHN CRANE" TEFLON-covered SHEETING ROLLS *Can't Stick!*

If you've been plagued with sticking dough, here's your solution to the problem. TEFLON-covered rolls *won't stick.* Present users report better products, simpler operation and large savings through elimination of dusting or scraping.

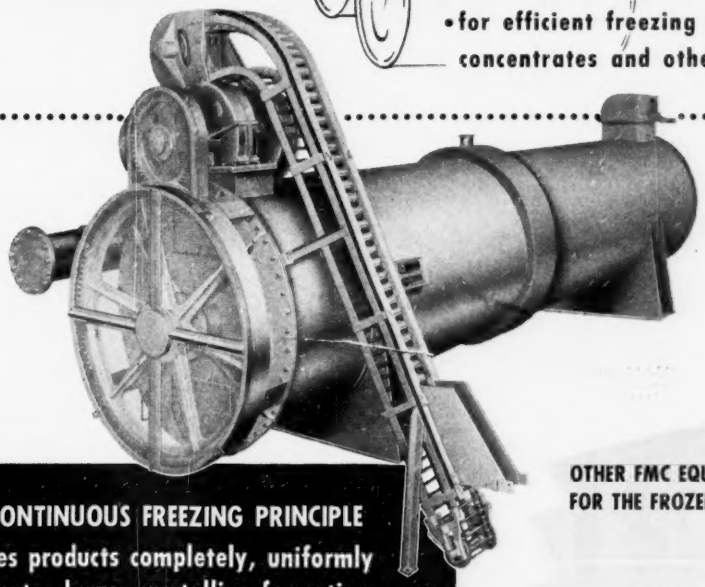
These rolls covered with a thin molded layer of Teflon are just one of our outstanding CHEMLON line of TEFLON-fabricated products. This material is entirely safe on any food processing application. Why not let "John Crane" engineers solve your sticking problems now?

Write for full information

CRANE PACKING COMPANY
1837 CUYLER AVE. • CHICAGO 13, ILLINOIS
Offices in all Principal Cities in United States and Canada

New *fmc* Continuous Can Freezer

• for efficient freezing of citrus juice concentrates and other food products

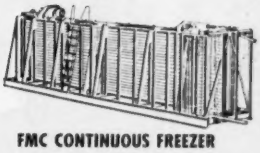


FAST CONTINUOUS FREEZING PRINCIPLE

- freezes products completely, uniformly
- eliminates large, crystalline formations
- increases capacity, cuts cost

The new FMC Can Freezer provides rapid and thorough freezing of canned citrus juice concentrates and other food products, in capacities up to 300 cans per minute of the popular 6 ounce size. Speed and uniformity of freezing is accomplished by means of a specially designed internal circulating system, utilizing a refrigerant flow and circulation method which provides the most efficient heat transfer at high freezing rates. The unusual processing features of the quick freezing unit result in maintaining excellence of product quality, flavor and appearance, and the elimination of large crystalline structure not uncommon in slower freezing methods. A completely self-contained unit, the FMC fully automatic Can Freezer is simple to install, does not require an insulated room, and occupies a minimum of floor space.

OTHER FMC EQUIPMENT FOR THE FROZEN FOOD INDUSTRY



FMC CONTINUOUS FREEZER for prepackaged foods

FMC CARTON set-up, filling and closing equipment

Write for full information or contact your nearest FMC representative

First in Diversified Food Equipment

fmc FOOD MACHINERY AND CHEMICAL CORP.

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Divisions

General Sales Offices:

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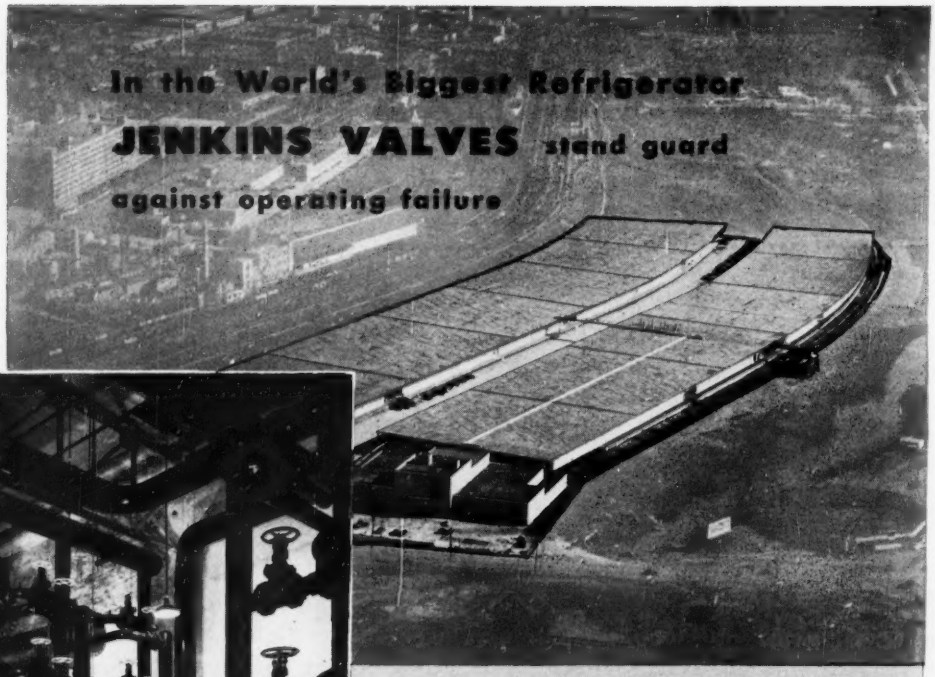
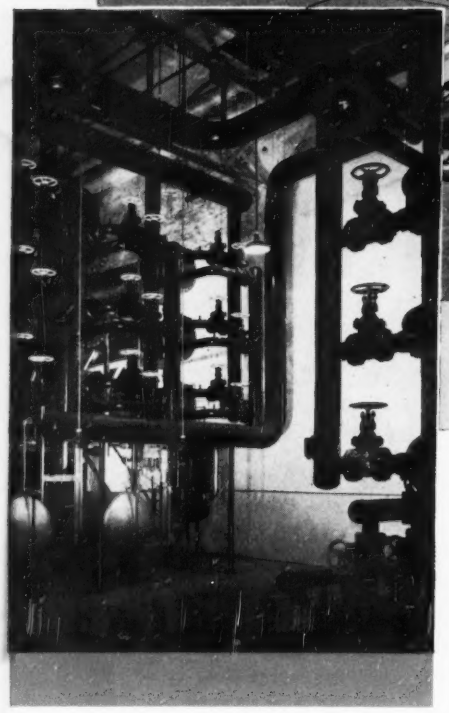




More than 1000 Jenkins Valves are used for control of steam, water, brine, in piping systems for refrigeration, heating, fire protection, sanitation and other essential services.

THE 22-acre Alford Refrigerated Warehouse in Dallas, Texas, is "the biggest refrigerated area this side of the polar ice cap." With millions of dollars worth of perishable goods entrusted to constant cold, valves, like all other mechanical equipment, must perform with unfaltering efficiency.

For this reason, and with the further objective of low maintenance costs, the Alford management standardized on Jenkins Valves. More than a thousand are used along the miles of vital pipelines.

Jenkins builds extra endurance into valves—proved time and again by low upkeep cost records in every type of service. Yet, *you pay no more* for Jenkins Valves, despite this extra value. Let the Jenkins Diamond be your guide to valve economy . . . for new installations, for all replacements. *Sold through leading Industrial Distributors everywhere.* Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros. Ltd., Montreal.

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864
TRADE JENKINS MARK

Jenkins Bros.

Serving Industry... which Serves Mankind

PROFIT POSSIBILITIES FOR FOOD INDUSTRY

Monsanto Flavor and Aroma Chemicals are one group among more than 400 Monsanto Chemicals and Plastics, of which more than two score directly serve the Food Industry. If you would like information on how these products can help you improve your products, cut costs or increase sales, mail the coupon or contact the nearest Monsanto Sales Office.

PRODUCTS OF HIGH PURITY

Monsanto Flavor and Aroma Chemicals are uniformly high in quality and they have purity that is obtainable only in synthetics. Such uniform purity is your assurance of identical flavors and aromas every time you employ these chemicals. Monsanto Flavor and Aroma Chemicals have full strength and have the ability to "stay" through processes which require extremes of heat or cold. Such "staying power" gives your products inviting aromas and appealing flavors to create *first* sales and bring *repeat* purchases. Specify Monsanto Flavor and Aroma Chemicals.

ETHAVAN (Monsanto's ethyl vanillin), used in both cones and ice cream, has the "staying power" even through heat of baking . . . through alternate heat and cold of ice cream making. Ethavan is used wherever delightful vanilla-like flavor and aroma are desired. Ethavan is economical because it has approximately three times the flavoring strength of vanillin. Monsanto also produces vanillin.

COUMARIN and VANILLIN

have broad roles in serving the food industry. They are used to mask undesirable tastes and odors in paper, which are often picked up by such products as candy and cookies. And, of course, they give food products superior flavor. Coumarin, which has been made by Monsanto since 1915, is one of the purest chemicals known. It is used alone or to "fixative" other flavor and aroma chemicals, such as Ethavan and vanillin.

METHYL SALICYLATE,

U. S. P., Monsanto's synthetic oil of wintergreen, is chemically identical with the natural product but methyl salicylate has higher purity and greater uniformity.

SACCHARIN fills all the requirements of a perfect sweetener. It is approximately 375 times as sweet as sugar . . . is easy to use . . . is economical. Monsanto was the first American company to produce saccharin.

FREE PAMPHLETS on Monsanto Flavor and Aroma Chemicals give you a great deal of technical information and many suggestions on the use of flavors and aromas. Indicate the literature you want, and mail the coupon today. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1737-G South Second Street, St. Louis 4, Missouri.

Ethavan: Reg. U. S. Pat. Off.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

MONSANTO
CHEMICALS AND PLASTICS

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
1737-G South Second Street, St. Louis 4, Missouri

Please send literature as indicated. . . . . Booklet, "Something About The Senses." . . . . . Leaflet, "Coumarin." . . . . . Leaflet, "Ethavan." . . . . . Leaflet, "Methyl Salicylate." . . . . . Leaflet, "Saccharin." . . . . . Leaflet, "Vanillin."

Name ..... *Title* .....

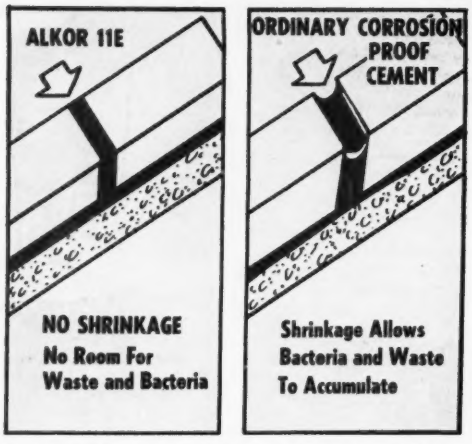
Company .....

Street .....

City ..... *Zone* ..... *State* .....

SERVING INDUSTRY . . . WHICH SERVES MANKIND

GREAT NEWS! Atlas research announces



ALKOR 11E

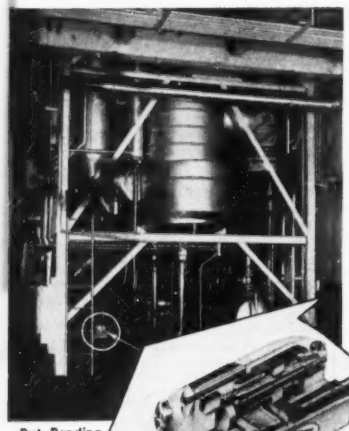
the superior acid and alkali proof cement for brick and tile floors

This is the news you have waited for, ALKOR 11E, the nearest thing to a universal corrosion-resistant cement. Check these properties: Inert to all solvents and alkalies; Resistant to all non-oxidizing acids; No appreciable shrinkage on setting; No obnoxious odors; Excellent workability; Easily tooled; Adhesion to wire cut brick greater than 500 psi; Tensile strength 1500 psi; Compressive strength 15,000 psi; Heat accelerates setting only, no fumes or smoke; Sets in less than 24 hrs. at 70° F. For complete information write us at 12 Walnut Street, Mertztown, Penna.

A COMPLETE LINE OF CORROSION-PROOF CONSTRUCTION MATERIALS

ATLAS HAS PROTECTED INDUSTRY OVER HALF A CENTURY

THE ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNA. HOUSTON, TEXAS



Pat. Pending

FOR LONGER *Continuous* SERVICE

WATEROUS 100% SANITARY PUMPS

Use a WATEROUS 100% Sanitary Pump with an evaporator (as shown at left) or in many other food processes. Advanced pump design assures you of accurate volume control . . . easy cleaning . . . and long life.

Ideal for citrus concentrates, grape, apple, tomato and other juices, cream style corn, frosting, milk products, pumpkin filling and many other food products.

Only WATEROUS Pumps offer all these features:

1. Easy flushing self-draining stationary seals.
2. One-piece rotor and shaft with no threads or splines in product zone.
3. Type 316 stainless steel for all metal parts.
4. Built-in gear reduction.
5. Positive internal clearance control.
6. Compliance with all 3A Sanitary Code Standards.

Make your next pump a WATEROUS 100% Sanitary Pump . . . it is your best pump investment for proven performance and long continuous service. Let us mail you our new illustrated bulletin P-332. Write for it today.

1. For thin, viscous, pulpy or semi-solids
2. For vacuum or pressure
3. Easy maintenance
4. Capacity 1-125 G.P.M.

Designed and manufactured by experienced engineers.

If it's 100% SANITARY—it's a WATEROUS

Waterous DEPENDABLE PUMPS SINCE 1886

WATEROUS COMPANY
80 EAST FILLMORE AVE.
ST. PAUL 1, MINNESOTA

Dutton BOILERS

SINCE 1880

ECONOMIST GAS - OIL HAND-STOKER

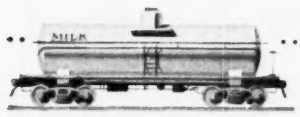
The time-tested HRT type modernized by Dutton into one fully portable unit. Bricked and insulated in steel case at factory; no special foundation needed. High efficiency and low fuel cost. Write for catalog.

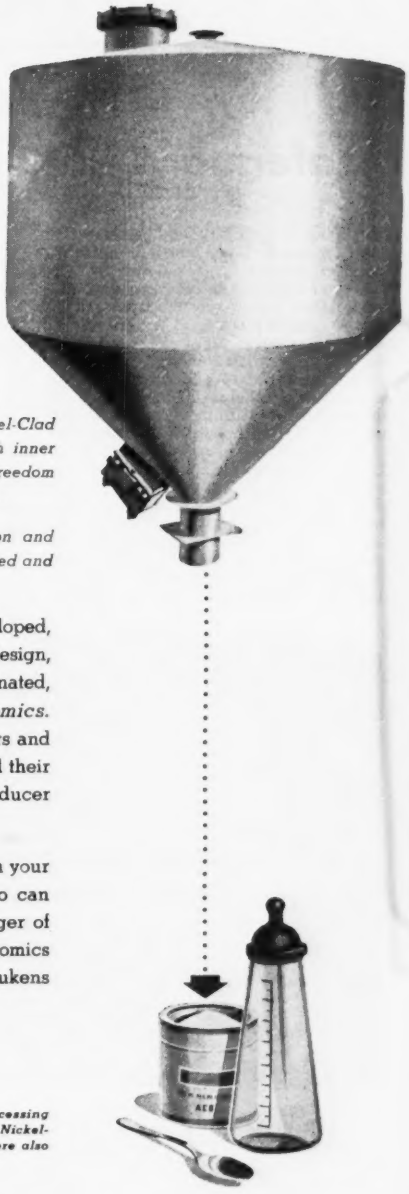
Nation-Wide Sales & Service Engineer Organization

HOT WATER AND STEAM GENERATORS FOR HEATING, PROCESSING OR POWER

THE C. H. DUTTON COMPANY
730 Gibson St. Kalamazoo, Mich.

How to Keep a Powdered Food Product From "Packing"...





EXAMPLE—*Economical, efficient handling in packaging a powdered, modified milk preparation to avoid product contamination and powder "packing" at M & R Dietetic Laboratories, Columbus, Ohio.*

DESIGN—*Tank with free-flowing contours built of Lukens Nickel-Clad Steel and equipped with powerful electric vibrators. Smooth inner nickel surface to insure protection of product purity and aid freedom of flow. Steel backing to give required strength and rigidity.*

RESULT—*Powder flows steadily to conveyor-packer, supervision and maintenance greatly reduced, washing out with water simplified and high purity easily maintained.*

These benefits are typical of results achieved with newly developed, more efficient food processing equipment. And wherever design, fabrication and materials selection must be critically coordinated, you will find the economical answer in applied *Lukenomics.* Lukenomics combines the experience of designers, engineers and equipment builders with Lukens' knowledge of materials and their application gained over 140 years as the world's leading producer of specialty steel plates, heads and steel plate shapes.

It's sound investment insurance to put Lukenomics to work on your equipment problems. There are progressive fabricators who can do this for you. Get in touch with them or write our Manager of Marketing Service, stating your problem. There's a Lukenomics team ready to go to work on it. Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.

Glascote Products, Inc. fabricated the above processing tank for M & R Dietetic Laboratories using Lukens Nickel-Clad Steel. Lukens Flanged and Dished Heads were also used in the equipment.

LUKENS

LUKENS STEEL COMPANY

BETTER PRODUCTS FOR BETTER EQUIPMENT

Appetite Appeal SELLS FOOD

That's why it pays to safeguard flavor with U·S·S Stainless Steel

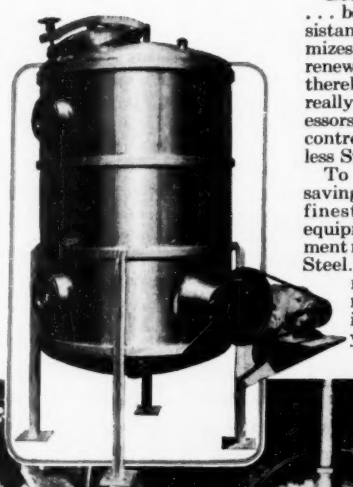
Most people don't buy food because it's good for them. They buy it because it *tastes good* to them.

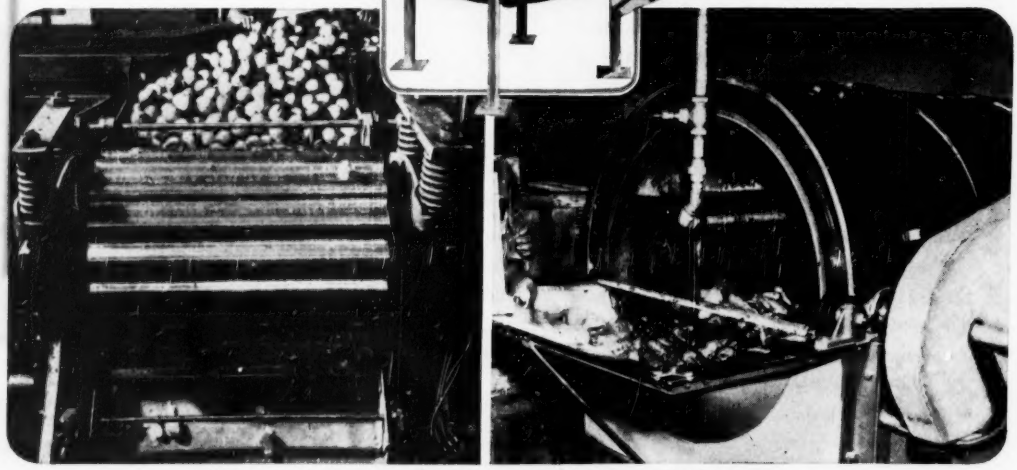
If you can retain delicate, garden-fresh flavor in your peas, beans, strawberries, citrus fruits and juices, you'll have a big edge on competition. Preserving the natural flavor that customers go for takes plenty of food processing know-how plus equipment that can't impart off-taste or off-odor. And that's where U·S·S Stainless Steel comes in.

The smooth, lustrous surface of U·S·S Stainless Steel is unaffected by virtually all food products. You'll never find pits and cracks that catch and hold stray food particles. And the ease with which U·S·S Stainless can be cleaned and kept clean not only means freedom from contamination and less lost time due to cleaning, but also opens the door to multi-product processing.

Because U·S·S Stainless is so durable . . . because it has such exceptional resistance to corrosion . . . its use minimizes interruptions in processing for renewing or repairing of equipment, thereby making continuous processing really continuous. In fact, many processors have built their entire quality control programs around U·S·S Stainless Steel equipment.

To assure yourself all these cost-saving advantages . . . to obtain the finest performance from Stainless equipment, be sure that your equipment manufacturer uses U·S·S Stainless Steel. This perfected, service-tested material is available in a complete range of forms, grades and finishes. It's *made* to pay off for you in satisfactory performance.





AMERICAN STEEL & WIRE COMPANY, CLEVELAND · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

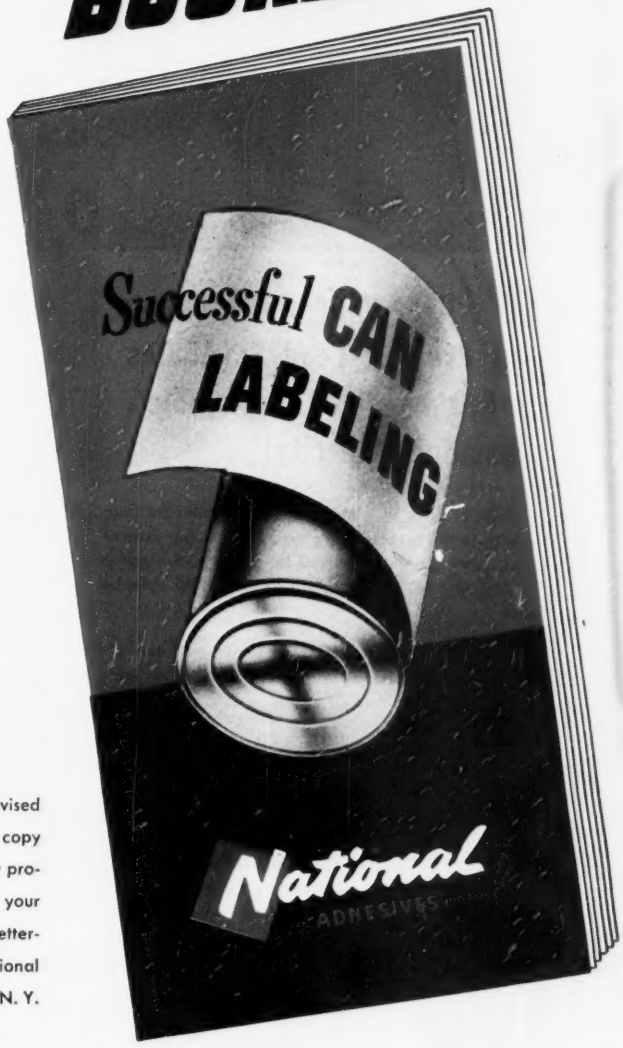
0-1187

UNITED STATES STEEL

FREE Trouble Shooting BOOKLET

Check this can labeling list

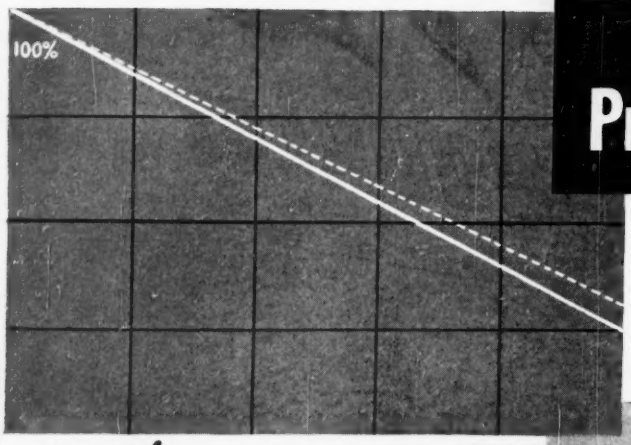
- ☐ Staining
- ☐ Rusting
- ☐ Slipping Or Crooked Labeling
- ☐ Poor Adhesion At Overlap
- ☐ Curling At Overlap
- ☐ Wrinkling At Overlap
- ☐ Loose Labeling
- ☐ Failure To Pick Up Labels
- ☐ Tearing Of Labels
- ☐ How To Select Hot Pick-up Gums
- ☐ Advantages Of Cold Gums



You'll find the answers in National's newly revised handbook: SUCCESSFUL CAN LABELING. A copy should be in the hands of every one of your key production men . . . and each new employee on your labeling line. Jot down their names on your letterhead. We'll do the rest — *free of charge!* National Adhesives, 270 Madison Avenue, New York 16, N. Y.

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE

POWER COST DROPS with Product Load



28% POWER COST

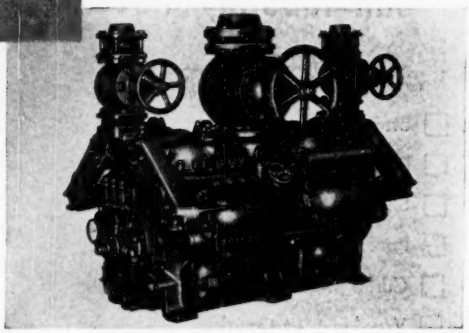
25% PRODUCT LOAD

NOW! Base Your Power Costs on Product-Load Schedules —Not on Fixed, Inflexible Machine Capacity!

You can look to York V/W Ammonia Compressors for huge savings in your power costs—an almost straight-line ratio of power cost reduction during partial load periods. Savings as high as 72% at 25% capacity with 8, 12 and 16 cylinder machines!

What's more, York V/W Ammonia Compressors start *unloaded*—and smaller starting power requirement means more power saving!

And through flexibility of output, a York V/W Ammonia Compressor permits more efficient scheduling of man hours and product loads. For all the facts about York's V/W Ammonia Compressor—the result of 65 years of leadership in mechanical cooling development and *field-proven* for over 12 years—see your nearest York Representative. Or write direct for free booklet. York Corporation, York, Pennsylvania.



The York V/W Ammonia Compressor is available in 4, 6, 8, 12 and 16 cylinder models. Built-in flexible capacities match every industrial processing need. Operation possible with any prime mover, including steam turbine, permitting use of low pressure steam, or waste steam.

BE SURE YOU GET THESE YORK EXTRAS IN YOUR NEXT AMMONIA COMPRESSOR!

1. LOW INITIAL COST.
2. LOW OPERATING COST.
3. LOW MAINTENANCE COST.
4. SPACE-SAVING COMPACTNESS.
5. SIMPLIFIED MOTORS AND STARTING CONTROLS.
6. VIBRATION-FREE OPERATION.
7. FILTERED LUBRICATION.
8. POSITIVE LUBRICATION.
9. POSITIVE SHAFT SEAL.
10. BOOSTER AND/OR HIGH-STAGE OPERATION.
11. COMPLETE LINE.

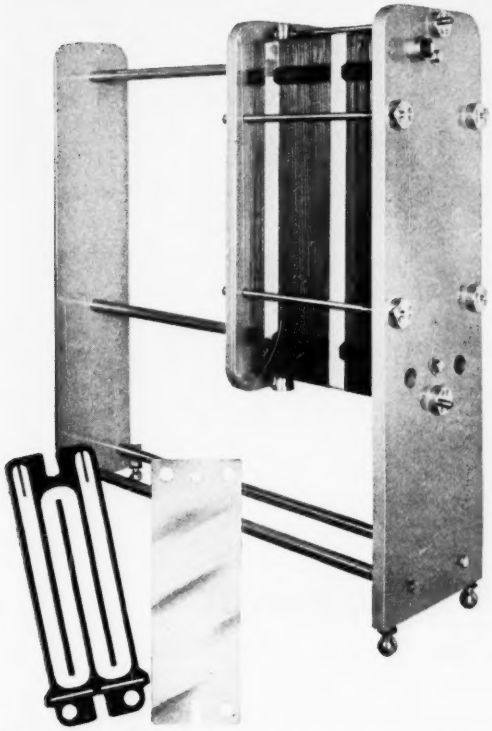
York refrigeration air conditioning

The big advances come from YORK

Headquarters for— **Refrigeration and Air Conditioning**

Something Really New... Pfaudler

"SANI-PLATE" FILM FLOW HEAT EXCHANGERS!



FEATURING ADVANCED SANITARY DESIGN

Pfaudler announces a plate heat exchanger with the same advanced sanitary design features that mark all Pfaudler equipment. Field tested for three years as the United unit, Pfaudler now brings it to you with improved features.

The Pfaudler "Sani-Plate" departs from conventional design through the elimination of plate corrugations and gaskets fastened to steel, both of which are possible sources of bacterial contamination. Pfaudler "Sani-Plates" are perfectly smooth, made of polished stainless steel. They are separated with sanitary divider seals which direct product and medium completely across the plate for fast heat exchange. Simplicity and sanitation keynote design.

Now dairies, *large and small*, can cool, heat or regenerate in a plate heat exchanger for greater economy—capacities from 1000 lbs. minimum to 20,000 lbs. per hour! Pfaudler HTST pasteurizers are equipped with accurate controls, pumps, holding tubes and balance tank, all built into the unit. For further information and prices, use form below.

TYPICAL SATISFIED USERS

Borden Company, Mfg. Division	Elgin, Illinois (3)
Seeley Dairy Company	Chicago, Illinois
Minnesota Creamery Company	St. Paul, Minnesota (2)
Furnas Ice Cream Company	Des Moines, Iowa
Western Condensing Co.	Eldorado Springs, Missouri
Dailey Pickle and Canning Co.	Saginaw, Michigan
Mendota Cheese Company	Mendota, Illinois
Lanes Jersey Dairy	El Paso, Texas
M. Stephens Company	Chicago, Illinois (2)
Eagle Dairy Products Co.	Detroit, Michigan (2)
Chocolate Products Company	Chicago, Illinois
Croswell Pickle Company	Croswell, Michigan
Morrocco Wine Company	New Brunswick, New Jersey
Stokes Dairy Farms	Franklin Lakes, New Jersey
U. S. Dept. of Agriculture	Albany, California
Snee Dairy Company	Pittsburgh, Pennsylvania

. . . and many, many others

EASY TO CLEAN—Smooth polished stainless steel plates are easy to clean. One-piece rigid sealers, coated with thermoplastic, are odorless, tasteless, heat resistant and sanitary. No crevices where rubber joins steel to worry about.

INEXPENSIVE TO INCREASE CAPACITY—Plates and sanitary sealers are easy to remove and insert, permitting adaption of any unit for different applications quickly.

BUILT FOR HIGH PRESSURES AND TEMPERATURES
The design of this unit is such that pressures as high as 50 psi. are considered normal. Materials are approved for temperatures up to 250° F.

The Pfaudler Co., Dept. FI-7, Rochester 3, N.Y.

Please send more information about the New Pfaudler Sani-Plate Film Flow Heater. Capacity required_____

_____

Name_____

Company_____

Address_____

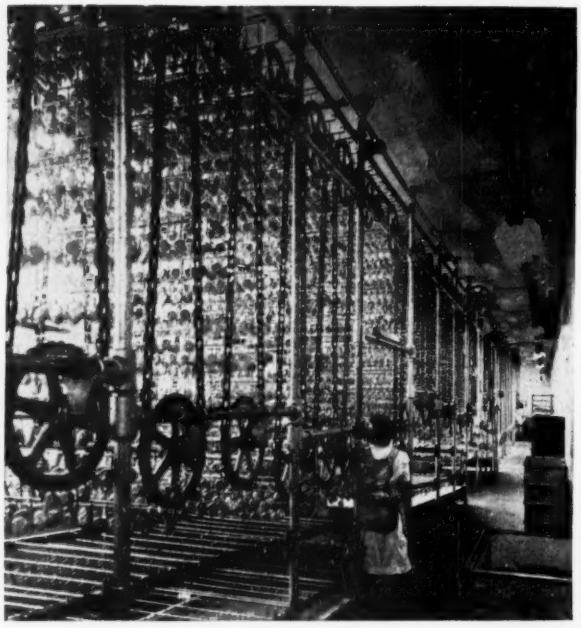
City_____ Zone_____ State_____

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

GLASS-LINED STEEL
Hastelloy—Aluminum
Tantalum—Carbon Steel
Solid or Clad Stainless Steel
Nickel, Inconel, Monel

LINK-BELT SPROCKETS and STOCK CHAIN USED



...in the Kroger Co.'s special conveyor

This festoon type iced cookie dryer is over one-fifth of a mile long! Over its entire length, precision steel roller chain assures smooth operation. Link-Belt stock standard chain with extended pins and cut tooth sprockets are used in this installation.

Link-Belt stock roller chain is available with numerous stock attachments. A wide variety of combinations is possible, thus enabling you to develop "special" processing or handling equipment from our stock.

A Link-Belt Engineer is near you to serve you!

LINK-BELT COMPANY

Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg.
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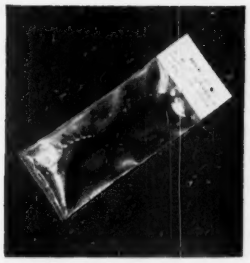
LINK-BELT *Precision Steel*
ROLLER CHAINS AND SPROCKETS

HOW TO PROTECT QUALITY CONTROL



OPTICAL FRAMES made by Bay State Optical Company, Attleboro, Mass., are protected by Plaxpak polyethylene envelopes against tarnishing, discoloration and abrasion. Envelopes are fabricated by Kellogg Container Division, U. S. Envelope Company.

PLAXPAK FILM'S high chemical resistivity and moisture-proof protection improve and simplify packaging of corrosive chemicals. Hooker Electrochemical Company uses Plaxpak drum liners to package monochloroacetic acid and seal it against moisture.

DIAPER BAGS of Plaxpak polyethylene film introduce new era of clean, odor-free and moisture-proof laundry service. Developed by Dependable Products, Inc., New York City, the Plaxpak bags cost less, last longer, and are more satisfactory to customers.

ONLY MATERIAL PEAT HUMUS won't eat through is reason why Clinton Nurseries, Clinton, Conn., selected Plaxpak polyethylene as packaging material. Plaxpak is also used for Potting Soil and African Violet Soil. U. S. Envelope Company makes bags.

CONVENIENCE PLUS FOR SUNBATHERS — Matthew's Suntan Spray in the unbreakable Plaxpak polyethylene bottle. Slight squeeze of the bottle produces fine spray of lotion which can be rubbed into the skin. No mess, no waste — so easy to use.

ATTRACTIVE TRAVEL KIT by Jean Naté features nine-ounce Plaxpak bottle of "friction pour le bain" after-bath lotion. Lightness and unbreakability of Plaxpak bottle make it an ideal container for traveling. Takes rough handling, squashing in stride.

★ In addition to its packaging products, Plax makes a wide variety of thermoplastics in rod, sheet, tube, and other forms.

Outside can't come inside when you wrap products in Plaxpak polyethylene film. Here is single-wall protection that keeps out moisture, that is non-aging and tear-resistant. Seal your product against temperature changes, storage and handling. Keep it the way you made it with Plaxpak polyethylene film. Write for our new catalog, or send for a Plax representative.

PLAX BLOW MOLDED PRODUCTS ARE MADE UNDER THE FOLLOWING U. S. PATENTS 2028239, 2175053, 2175054, 2230188, 2230190, 2260750, 2283751, 2349176, 2349177, 2349178

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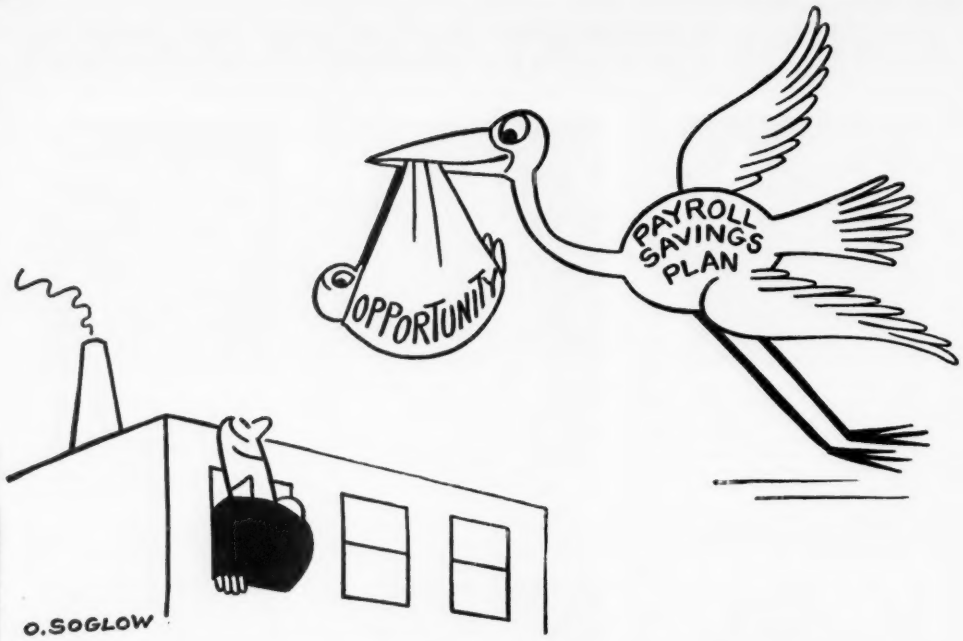

Put more opportunity into your company's future

WITH THIS FIVE-STEP PROGRAM

Here's an easy-to-follow program that will substantially increase your company's chances for a prosperous future.

Nation-wide experience in 20,000 companies proves that this popular program also pays off handsomely *today*. It increases each participating employee's peace of mind—making him a more contented, more productive worker. It reduces absenteeism, lowers accident rates, increases output, and improves employee-employer relations!

This program is simply a proved formula for building membership in the Payroll Savings Plan—the "automatic" system by which millions of workers are investing in U. S. Savings Bonds every pay-day.

What Are the Five Steps?

The benefits of the Payroll Savings Plan to your company are in proportion to the percentage of employees who participate. Nation-wide experience indicates that 50% of your employees can be persuaded to join *without high-pressure selling*. Here are five steps which have proved to be the "magic formula" for putting over the Plan. They will get results for you:

1. See that a top management man sponsors the Plan.
2. Secure the help of the employee organizations in promoting it.
3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.
4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Check up on the Payroll Savings Plan in your company. If fewer than half of your employees are participating, you have a lot to gain by following the five-step program outlined here. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bond Division. While it's on your mind, why not call him right now? Or write the Treasury Department, Washington 25, D. C.

Are You With It?

In the current national Savings Bonds campaign, May 16-June 30, the Treasury Department asks each company operating the Payroll Savings Plan to canvass all employees, with the goal of having at least half of them signed up by the end of the month. This advertisement tells how you can achieve that goal most easily.

The Treasury Department acknowledges with appreciation the publication of this message by

McGRAW-HILL PUBLICATIONS

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

Batch cooking fruits and other pie fillings in steam kettles heated by central Sellers Gas-steam Boilers.

Reed Gas-fired Tunnel Oven used for continuous baking of covered pies.

FOOD PROCESSING OPERATIONS AT The Real Pie Bakers

THE ONLY PIES

DEMONSTRATE VERSATILITY OF GAS

Filling open-type pie shells as they rotate in Gas-fired Fish Rotary Oven.

A MILLION PIES would be something of a record for any bakery, but it's only part of the total prepared during the last 25 years in the Gas Ovens of THE REAL PIE BAKERS, Pittsburgh, Pennsylvania.

Actually, pie-baking is only the final step in a series of food processing operations in which GAS plays so important a role. Then, after the products are on their way, this same fuel, and modern Gas-fired Equipment, take over the jobs of cleansing and sanitizing.

In the preparation of fruits alone the importance of GAS is emphasized by the 40,000 bushels of apples and 500,000 pounds of fruits and berries processed during 1949. Cooking vats supplied with steam from Sellers Gas-fired Boilers are used for this purpose—and steam proof boxes are also served from this source.

Baking is performed in a Reed Tunnel Oven and three Fish Rotary Ovens. Filled and glazed donuts are deep-fat fried in a Gas-fired Vitamatic Donut Fryer.

Food processing with GAS is the modern, efficient way to obtain uniform results and THE REAL PIE BAKERS have taken full advantage of the versatility of GAS by applying it to their wide variety of heating requirements.

GAS will serve you just as efficiently and economically—and your Gas Company Representative will show you how.

MORE AND MORE... THE TREND IS TO GAS

AMERICAN GAS ASSOCIATION

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FOOD via Stainless Steel Fruehaufs

"We not only move meats faster at less cost, but we give our customers better service . . . and get products to them in better condition with Trailers," says Harry W. Davis, Director of Traffic for John Morrell & Co.

. . . brought to you FASTER, FRESHER . . . CHEAPER, TOO!

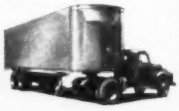
FASTER

BECAUSE OF FRUEHAUF'S SMOOTH, EASIER-ROLLING GRAVITY-TANDEM! Users report this Suspension pulls *one gear higher* . . . gives up to 247,000 miles per tire!

FRESHER

BECAUSE FRUEHAUF STAINLESS STEELS FEATURE "ENGINEERED" INSULATION. Foods arrive fresher in Fruehaufs because of non-corrosive Stainless Steel; precise insulation.

CHEAPER, TOO!



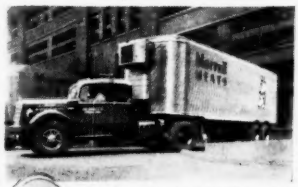
FRUEHAUFS HAUL BIGGER LOADS . . . NEVER WEAR OUT! Stainless Steel is stronger and lighter . . . non-corrosive . . . can't rust out!

FOOD via Stainless Steel Fruehaufs . . . is brought to you FASTER, FRESHER . . . CHEAPER, TOO!

Fast, low-cost Trailer Transportation saves you money on the things you buy every day — on nearly everything you eat, wear and use. Trailers help industry cut overhead by hauling *more* for *less* . . . enabling industry to give you better products *cheaper.*

Fruehauf Trailers, tailored to their tasks in over 100 different industries, are proving themselves to be the cost-cutting "champs" on the highway. Operating records prove no other Trailer costs less to operate . . . per mile, per day, per year. For full facts on the *Trailer way to transportation savings* in your business, ask for Fruehauf's free "Transportation Cost Analysis." Write — Fruehauf Trailer Company . . . Detroit 32 . . . Los Angeles 58 . . . In Canada: Weston, Ontario.

TRUCKS HELP BRING YOUR FOOD—The U. S. Department of Agriculture has estimated that 98 per cent of this country's farm products moves all or a good part of the way to market by truck and Trailer.



1000 MILES in 31 HOURS

This Fruehauf hauls 27,500 lbs. of fresh meats and butter *1,000 miles in 31 hours* — from Ottumwa, Iowa to Mobile, Alabama — *almost two days faster* than by previous methods.

This same Fruehauf returns with supplies for Morrell—burlap bags, barrel staves, syrup and processing meats — adding to the money-saving, time-saving advantages offered by Trailers.

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80 Factory Branches coast-to-coast are *Headquarters* for low cost Trailer and Truck Body maintenance and repair.

FRUEHAUF *Trailers* WORLD'S LARGEST BUILDERS OF TRUCK-TRAILERS

ah! what delicious flavor

You'll agree, your customers will agree, it's the FLAVOR that makes the meal.

D&O has the Perfect Flavor and the correct flavoring materials to serve your every specific flavor requirement starting from shrimp cocktail sauce, to soup, to gravy... including powdered dessert and cake frosting.

SPICEOLATES,

the water-soluble spice flavors made by D&O from pure natural oils and oleo resins offer greater economy and completely uniform flavor quality. Spiceolates are pure products in every respect.

Additional information concerning the use of Spiceolates on request.

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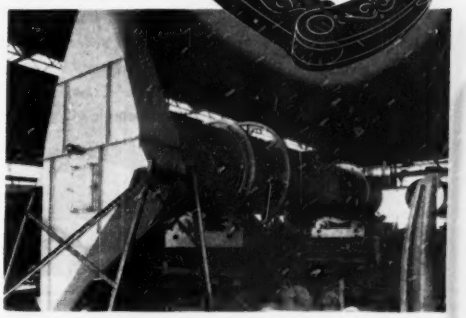
One of 3 principal units for processing roof granules



Have you ever wondered . . .
about the colored pebbles in composition roofing?
They are *artificially* colored.

THE PROBLEM:

- **DRY the granules before coloring**
- **BAKE the color for permanence**
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THE SOLUTION:

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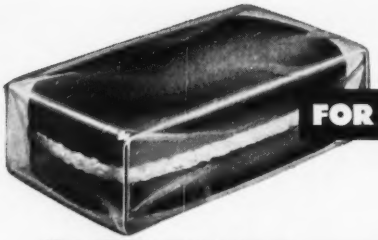

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Vitamin A Activity characteristic of "June" butter and natural plant materials offered as—

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CARROT OIL makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A. Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil, and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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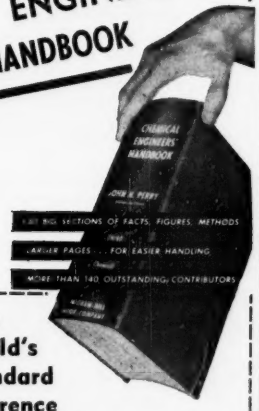
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PRODUCTION FOREMAN required for small factory Bahamas. Full knowledge and experience in mayonnaise and soup manufacture essential. Write stating age, experience and salary required to P-6814, Food Industries.

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FOOD CHEMIST—Long established organization desires aggressive individual with experience in the Food Field for research and development of specialty bulk products with emphasis on bakery products, stabilizers and ice cream manufactures. Location in New York area. Please give details of education, experience and salary desired. P-7072, Food Industries.

FOOD TECHNOLOGIST, chemist, plant manager, 8 yrs. experience. Exceptional record food research and development. Presently employed. PW-7071, Food Industries.

CHEMICAL ENGINEER—Completed five-year course at Cornell, B. Chem. E. June, 1950. Electived in bacteriology. Interested in application of chemical engineering methods to food processing. Best suited for development work. Available immediately. Opportunity more important than location. Complete resume upon request. Kenneth Oringer, N. Pascack Road, Spring Valley, New York.

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(Continued on the opposite page)

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2—Stokes & Smith GI Powder Fillers, M.D.

2—World Rotary Automatic and 8—semi-auto. Labelers.

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2986	2 M.&S. 6 Pocket Fillers for No. 2
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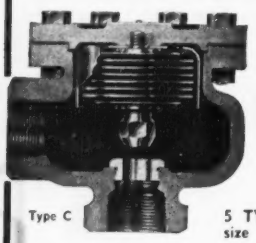
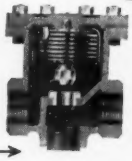
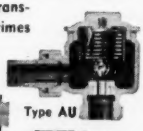


Type C

Type A



Type B



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F—15B

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McGRAW-HILL PUBLICATIONS

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F—14A

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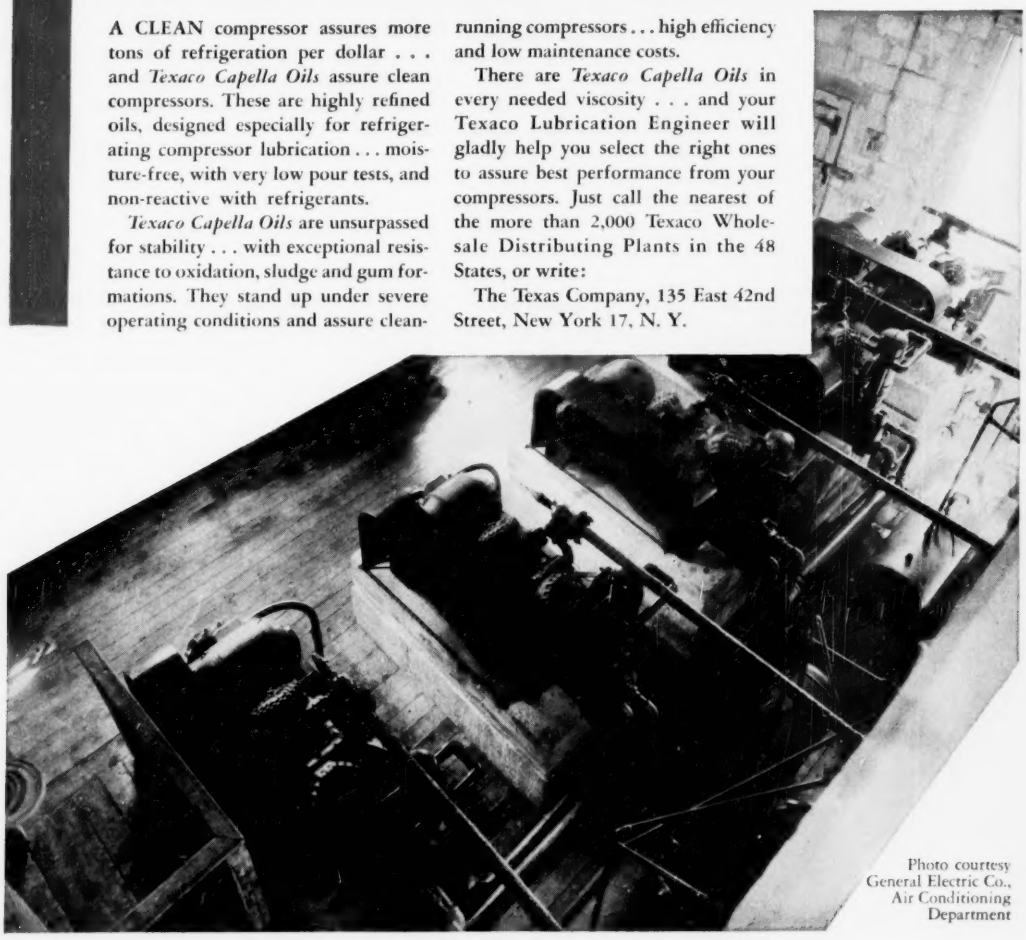

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